UNIVERSITY OF ARIZONA
A39001007143558B

Arizona
University
Library

Presented by

T. H. Kearney

UNIVERSITY OF ARIZONA
LIBRARY

John Bartram

THE BOTANISTS OF PHILADELPHIA AND THEIR WORK.

BY

JOHN W. HARSHBERGER, PH. D.

INSTRUCTOR IN BOTANY, UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE PENNSYLVANIA FORESTRY ASSOCIATION; THE PHILADELPHIA BOTANICAL CLUB; THE UNIVERSITY FIELD CLUB; THE DELAWARE VALLEY NATURALISTS' UNION; THE BOTANICAL SOCIETY OF PENNSYLVANIA; THE BIOLOGICAL CLUB, AND THE SOCIETY OF BOTANICAL PHYSIOLOGISTS AND MORPHOLOGISTS.

PHILADELPHIA.

1899.

Copyright, 1899,

by

JOHN W. HARSHBERGER, PH. D.

PRESS OF
T. C. DAVIS & SONS, 529 COMMERCE ST.
PHILADELPHIA

PREFACE.

This book is the outcome of much correspondence and research. It is a contribution to the history of botany in America. Until such a history is written, the facts concerning our botanists must be recorded in some permanent form. This, the present work, endeavors to do for the region comprised within a radius of sixty miles of the City of Philadelphia. If a circle of such a radius be drawn on a map, it will include the cities of Lancaster and Easton. Two considerations influenced the author in adopting this limit. (1) It is the one used by the Philadelphia Botanical Club in its herborization trips; (2) the country within that circle centralizes in Philadelphia.

Every available source of information has been searched in the endeavor to obtain reliable data. The author feels the shortcomings of the book, and he hopes that the botanical public will overlook the errors considering the fragmentary character of the information available in its preparation. It does not claim to be a complete list of the botanists who lived near Philadelphia; many names which ought to have been included are probably omitted for lack of information concerning them. The author believes that the omissions are few, and that the book gives the names of the greater number of Philadelphia botanists.

The names are arranged according to the dates of birth in the biographical portion of the book; according to the letters of the alphabet in the general lists. They are not

133210

always duplicated, although those persons sketched in the biographical portion may be members of the several botanical societies mentioned in this work. Bibliographies of each botanist are given as far as the limits of the book would allow.

Great care has been taken in the selection of illustrations. Many photographs of persons and places were made available by the kindness of friends, so that it became necessary to select a few in order to keep the number of the illustrations within bounds. Many of the biographical sketches are taken from various journals, all of which are duly recognized in foot-notes as the source of information. The author desires to thank the many kind friends who have, by suggestion, materially lightened the labor of preparation.

JOHN W. HARSHBERGER.

Philadelphia, August 1, 1899.
University of Pennsylvania.

TABLE OF CONTENTS.

PAGE.

List of Illustrations with Explanatory Text vii

Introduction 1

Biographies of Botanists 41

General List of Botanists 404

Appendices 416

Appendix I—Members Philadelphia Botanical Club 416

" II—Members Botanical Society of Pennsylvania . . 417

" III—Philadelphia Moss Chapter 422

" IV—Historical Account of the Scientific Journals and Serial Publications issued from Philadelphia . 422

" V—Horticultural Hall, Fairmount Park 429

" VI—Sketch of Noted Philadelphia Trees 431

Index 439

ERRATA.

Page 7—For Humphrey read Humphry.

" 20— " spice brush read spice bush.

" 43— " Monastery read Hermitage.

" 54— " St. Agustine read St. Augustine.

" 116— " Phaenogamous and Filicoid write phaenogamous and filicoid.

" 131— " carex write *Carex*.

" 146— " "had been lost" read "have been lost."

" 147— " Britten read Britton.

" 185— " red-wood, *Sempervirens* write red-wood *Sequoia sempervirens*

" 205— " "look up as testimonial" read "look upon as," etc.

" 221— " Rev. Jesse Y. Burke read Jesse Y. Burk.

" 303—I have adopted the German spelling Schäffer instead of Schaeffer; the ä being equivalent to the English ae.

" 309, note—For Towendsia read Towsendia.

LIST OF ILLUSTRATIONS

WITH EXPLANATORY TEXT.

Frontispiece. The Bartram Coat of Arms. Copied from the book-plate pasted in the Bartram family bible, in possession of the Pennsylvania Historical Society. Photographed and reproduced in heraldic colors by Mr. Julius F. Sachse, especially for this book. In the old bible the coat of arms, in color and on sheepskin, is also found, but is probably later than the book-plate, because the motto incorrectly reads: "Je avance," and John Bartram's name below is in modern type. The description of the Bartram arms is given in a foot-note on page 60 of this book.

1. Rapids Wissahickon Creek, Fairmount Park, reproduced by the Beck Engraving Company, from a photograph taken by Rau, Philadelphia.

2. View of the Wissahickon Creek about two miles above its mouth, reproduced from a photograph taken by Rau.

3. Devil's Pool, Cresheim Creek, Wissahickon, Fairmount Park, taken by Rau before the bridge and improvements were made, spoiling the romantic beauty of the spot, therefore, about 1885. The pool is behind the boy seated at the outlet.

4. Eastern Systematic Beds, Greenhouses and Biological Hall, University of Pennsylvania (looking west in September, 1896), before the completion of the Dormitories to the right. Photographed by F. R. Newell, especially for the author.

5. University Botanic Garden in 1898, with Biological Hall and Greenhouses looking toward Dormitories. Reproduced from a photograph taken by Mr. J. Morton Boice.

6. Pond and Rockery, University Botanic Garden (looking south). Photographed in September, 1896, by F. R. Newell, photographer, especially for the author.

7. University Botanic Garden, Pond, Biological Hall, Palm House, and House of Janitor, in 1898 (looking north). Photographed by Mr. J. Morton Boice.

8. View in Palm House in 1898, from a photograph taken by Mr. Aldrich Pennock, and reproduced in a pamphlet entitled: "A Short History of the Garden, prepared for the Ladies' Auxiliary Committee of the Botanic Society of Pennsylvania," by J. M. Macfarlane, Director of the Garden (1899). Half-tone plate, kindly loaned by the Director, for reproduction in this book.

9. Bog, Iris Bed and Rockery, University Botanic Garden, in September, 1896. Photographed by F. R. Newell, photographer, especially for the author.

10. Group of Sarracenias by the Pond, University Botanic Garden, in 1898, from a photograph taken by Mr. Aldrich Pennock, for the above-mentioned pamphlet, "A Short History of the Garden," and the plate loaned for reproduction in this book.

11. Drive in University Botanic Garden (looking northwest in 1898), from a photograph taken by Mr. J. Morton Boice.

12. Main Hall, Horticultural Building, Fairmount Park, from a photograph taken by Rau, photographer, and reproduced by the Beck Engraving Company, for this book.

13. Fern House, Horticultural Building, Fairmount Park, from a photograph taken by Rau, photographer.

14. Bartram's House (west front), from an illustration in *Garden and Forest*, IX: 123.

15. Bartram's House (south side), showing open door of the newly (1899) erected Memorial Library, and the celebrated Petre Pear Tree at the south-east corner, from a photograph by Rau.

16. Carved Stone Work, Bartram's House (east front). The lower window opens into the room supposed to have been Bartram's study. Over this window is a stone with this inscription:

"IT IS GOD ALONE, ALMYTY LORD,
THE HOLY ONE BY ME ADOR'D.
IOHN BARTRAM, 1770."

17. Bartram's House (east front), from a photograph by Rau.

Photograph taken by Dr. J. F. Holt, Professor in Boys' High School, about 1890.

18. Big Cypress, Bartram's Garden (looking toward the Schuylkill River). The Cypress was alive when this photograph was taken. Reproduced from a photograph taken by Dr. J. F. Holt about 1890.

19. Base of Big Cypress, Bartram's Garden, from a photograph taken by Dr. J. F. Holt about 1890.

20. Bartram's Garden, with large hemlock (since destroyed), along river front about 1890. Photograph taken by Dr. J. F. Holt.

21. Front of Humphry Marshall's House at Marshallton, Chester County, showing wooden observatory to the left. From a photograph in possession of the Academy of Natural Sciences, taken by R. S. Redfield, April 5, 1884.

22. Front of Marshall's House after the observatory had been removed. The door to the left leads into the so-called greenhouse of the botanist. From a photograph taken by the author on May 22, 1896.

23. Gotthilf Heinrich Ernst Muhlenberg, from a painting by I. Peale. Cut executed by Goodman & Piggott, and printed in red under the supervision of Mr. Julius F. Sachse. Plate the property of the Pennsylvania German Society, in the Proceedings of which Society, for 1896, it first appeared, illustrating an article by Professor Thomas C. Porter, "The Pennsylvanian German in the Field of the Natural Sciences."

24. Lewis David de Schweinitz, from a photograph furnished by E. A. Rau, of Bethlehem, Pa. The original was copied from a miniature painting, and this photograph, in turn, from an engraving of this miniature.

25. William Darlington, M. D., from a miniature cut furnished by Dr. William Sharpless, of West Chester, Pa.

26. Thomas Nuttall, from a photograph copied from a daguerreotype by E. A. Rau, of Bethlehem, Pa.

27. John Evans, from a photograph by G. A. Lenzi, Norristown, Pa. Loaned by his daughter, Mrs. A. E. Paxson, of Norristown, Pa.

28. Evans' House and Grounds, with flume of old mill. The house was renovated and changed by the present owner in 1896. From a photograph taken by the author, April 3, 1897.

29. Woods and Ithan Creek, Evans' Garden, from a photograph by the author, taken April 3, 1897.

30. Mill Dam in Evans' Garden (photographed in 1897).

31. Elias Durand, from a photograph furnished by E. A. Rau, of Bethlehem, Pa.

32. John H. Redfield, from a photograph furnished by E. A. Rau, Bethlehem, Pa.

33. Rev. Francis Wolle, from a photograph furnished by E. A. Rau, Bethlehem, Pa.

34. Professor Thomas C. Porter, D. D., LL. D., from a photograph taken by Alexander L. Pach, Easton, Pa., in 1889.

35. George Martin, M. D., from a photograph furnished by E. A. Rau, Bethlehem, Pa.

36. Professor Thomas Meehan, from a photograph taken about 1884. Loaned by his son, William E. Meehan, for reproduction in this book. Photograph by Hinkle, of Germantown.

37. Job B. Ellis, from an illustration in the *Botanical Gazette*, XV : 299 (1890).

38. John M. Maisch, from a gelatin illustration in the *American Journal of Pharmacy*, LXVI : 1. January 1894.

39. William M. Canby, from a photograph by J. Paul Brown, Wilmington, Delaware; furnished to the author in 1895.

40. William Herbst, M. D., from a valuable steel engraving, loaned to the author.

41. Charles Schäffer, M. D., from a photograph by Broadbent Brothers, Philadelphia; furnished to the author.

42. Joseph T. Rothrock, B. S., M. D., from a photograph.

43. Charles McIlvaine, from a half-tone plate loaned by him to the author.

44. Adolph W. Miller, from a half-tone plate loaned to the author. First used in the *Alumni Report Philadelphia College of Pharmacy*, January, 1896.

45. William P. Wilson, Sc. D., from a half-tone plate made at the Philadelphia Commercial Museums, and loaned to the author.

46. John W. Eckfeldt, M. D., from a photograph by Rothengatter & Dillon, Philadelphia.

47. Henry Trimble, from a photograph by F. Gutekunst Co., Philadelphia, taken in 1895.

48. George M. Beringer, from a photograph (enamel finish) by Garns & Co., Camden, N. J., taken in 1895.

INTRODUCTION.

Philadelphia lies in a nearly level plain, on the western bank of the River Delaware, in 39° 57′ 7.5″ N. latitude, and 75° 9′ 23.4″ west from Greenwich. The city is 86 miles from the Atlantic Ocean by the Delaware River, 125 miles in a direct line north-east of Washington, and 85 miles south-west from New York.

It is situated in a rich agricultural region, protected from the sweeping western and north-western storms by the range of hills known as the Blue Ridge. When first settled by white men, the region lying within 60 miles radius of the city, including New Jersey, was densely wooded with a great variety of fine forest trees, which, growing upon rich agricultural soil in south-eastern Pennsylvania, were rapidly cut down with the spread of cultivation. This region was the favorite haunt of the Delaware Indians. Intersected by two great streams, the Delaware and Schuylkill Rivers, any part of it could be reached by hunting parties in a short time by water. Into these two rivers, numerous creeks and rivulets run, swelling the volume of water which empties into the ocean at Capes May and Henlopen, and supporting a variety of important food-fishes, such as the salmon, shad, trout and cat-fish. Under cover of the trees and watered by the numerous streams which intersect the country, a surprisingly large number of herbaceous plants is to be found, which, together with the rich variety of graceful forest trees, give a peculiar charm to the entire district. In early days, the scenery must have been impressively beautiful

before the marring hand of man disturbed the equilibrium of nature. Forest and plain, streams and rivers tumbling over numerous cascades, rocky, fern-clad ravines, high hill summits give, even at the present day, a diversity to the landscape. Two or three spots, preserved in their primitive naturalness, still attest to the wild attractiveness of the scenery, which, nowhere very bold or grand, gives to the country a peculiarly peaceful aspect, in harmony with the moods of the early Quaker settlers. Two such places still preserve the quiet beauty of the early river scenery, namely: the Wissahickon and the Brandywine regions, a stream of the former name emptying into the Schuylkill in Fairmount Park, and one of the latter name into the Delaware near Wilmington. The Wissahickon is one of the most romantic of American streams. The slope of the land on each side is high and abrupt. Self-guarded by these rock battlements, it retains a primeval character. Along its banks trees and vines hang down to the water's edge, and numerous springs drip from the rocks. Its unbroken quiet, its dense woodland, its pine-crowned hills, its sunless recesses and sense of separation from the outer world contrast strongly with the broad meadows, flowing river, and bright sunshine of the adjacent region.

The topography of the district is no less marked than the general landscape. To the east of the Delaware, the low-lying plain of southern New Jersey, with an elevation at a few points of from 200 to 300 feet above sea level, is a very striking feature. This plain geologically dates its origin to the cretaceous and tertiary periods, and is made up of alluvium along the Delaware River and Atlantic Ocean beaches, and of yellow gravel, glass sand and sandy

RAPIDS, WISSAHICKON CREEK, FAIRMOUNT PARK.

UNIVERSITY OF ARIZ

clays, composing by far the greater extent of the so-called West Jersey tertiary formation, with the exception of a narrow band of the cretaceous green sand and marl beds, potter's clay, fire sands and clay, which parallel its course with the Delaware River, extending in a north-east direction to Raritan Bay. The western water-shed is traversed by streams, which, rising in the marl district and yellow-gravel region of the interior, flow into the Delaware, being affected in their lower reaches by tide-water. The eastern water-shed is intersected by several important streams, such as Mullica, Great Egg Harbor and Toms Rivers. These rivers mainly take their rise in cedar swamps and sphagnum bogs for which the region is noted. North of the marls, as we approach the mountians, a region in which red shale mainly predominates, is entered upon. West of the river, an undulating plain along the river front rises gradually to the older paleozoic hills, which reach an elevation of two hundred feet or more. Back of these, as the Blue Ridge is approached, the country becomes more undulating and broken by numerous hills of various geological formations.

Enough has been said by way of introduction to show that these topographic, hydrographic and geologic features have an important bearing on soil formation, and consequently on plant life and distribution. We find that each topographic, hydrographic and geologic district has some plants peculiar to it. Each of the plant communities, into which the flora of a district as large as Philadelphia can be divided, can be distinguished by the component plants, which, together with their collective features, give character to the vegetation of the particular geological, topographical

or hydrographical region. Such a flora as that of Philadelphia, comprising in New Jersey and Pennsylvania some 1200 species at the outside, can be classified into several ecological communities, such as the Hydrophytic, Halophytic and Mesophytic, the first of which, by way of example, may again be further sub-divided into those societies which comprise the water plants growing in the Delaware and tributary streams and Atlantic Ocean, such as the Plankton Society, the Hydrocharite Society, the Nereid Society, the Sea Grass Society, Schizophytic Society, Reedy Swamp Society, the Swamp Society, the Sphagnum Bog Society, the Cedar Swamp Society, etc.

The peculiar attractiveness of the region and the richness of the flora have so enticed botanists into the field that systematic botany has been almost exclusively the department of the science practiced by a majority of those mentioned in this work. Then, too, a living was not to be had by the prosecution of botany in America in the early days. It was pursued solely as a pastime and a healthy recreation by busy men, physicians, bankers and merchants. We find, however, in looking over the list of names, that wherever botany was pursued as the main object of life, that those men, who thus devoted their entire time to the science, became famous. Excluding names of the present generation, John Bartram, Humphrey Marshall, Zaccheus Collins, William Darlington, Elias Durand, John Evans, A. P. Garber, Joshua Hoopes, Peter Kalm, Adam Kuhn, James Logan, Isaac Martindale, André Michaux, G. H. E. Muhlenberg, Lewis D. von Schweinitz, Thomas Nuttall, W. P. C. Barton, Charles Pickering, Frederick Pursh, C. S. Rafinesque, John Redfield, and David Townsend, achieved distinction

VIEW OF WISSAHICKON CREEK, FAIRMOUNT PARK.

UNIVERSITY OF ARIZONA
LIBRARY

along systematic lines. It was not until after the perfecting of the microscope and the epoch-making period, beginning with issue of Darwin's Origin of Species, that the modern study of botany may be said to have begun in Philadelphia. The pursuance of botany in Philadelphia and in America generally can be divided into four periods:

(1) The early descriptions of the flora by persons not conversant with botany, who described the plants after the manner of the old herbalists, chiefly as interesting rarities, or as useful, natural medicines. The sect of German Pietists presided over by Kelpius, established in 1694 on the lower Wissahickon, a garden where medicinal plants were raised for use and study. It may, therefore, be styled the first garden in America where a botannical arrangement of plants was made.* In 1739 was published at Leyden, in Holland, an essay in Latin, entitled, "Experimenta et Meletemata de Plantarum generatione," by the learned Governor of Pennsylvania, James Logan. It was afterwards, in 1747, republished in London, with an English translation, by Dr. John Fothergill. The experiments and observations were admirably illustrative of the doctrine of sexes of plants† established by Jacob Camerarius. This may be said to be the first work of any botanical importance issued by a Philadelphia botanist. Many of Logan's ideas smack of medieval scolasticism, so that he is properly placed in the Pre-Linnæan period.

(2) The period of the ascendency of Linnæan ideas. John Bartram was one of the first persons who may be said

*SACHSE. *The German Pietists of Pennsylvania*, p. 75.

† See an article of mine, "James Logan," *Botanical Gazette*, Aug., 1894.

1889. SACH'S *History of Botany*, 391-392.

1849. DARLINGTON—*Memorials of Bartram & Marshall*, 21.

to have used the Linnæan system in the study of plants. Dr. Benjamin Franklin introduced Bartram to European botanists, among them Doctor Gronovius, who presented the Quaker botanist with Linnæus's Systema Naturæ of 1740.* The overwhelming influence of the great Linnæus gave to the botany of the eighteenth century an almost exclusively systematic and descriptive character. Linnæus was the author of the binomial system of nomenclature of plants and animals, which still goes back to his work as its basis, and of the artificial "sexual system" of classification based on the stamens and pistils of the flowering plants, whose functions, as reproductive organs, were already realized. The order which he brought out of the chaos of descriptive natural history was a blessing so unalloyed, and his system was so simple and seductive, that it was many years before most botanists again began to realize that their science properly comprehends other problems than those involved in naming and pigeon-holing plants.

It was while the Linnæan enthusiasm was at its height that the first Philadelphia botanists appeared on the scene.

In the year 1748, Peter Kalm, a Swedish naturalist, and pupil of Linnæus, visited Pennsylvania and spent three years in exploring America, and in 1753 published his travels.† Doctor Adam Kuhn, of Philadelphia, was proba-

*1740. LINNÆUS—*Systema naturæ, in quo naturæ regna tria, secundum classes, ordines, genera, species systematice proponuntur Editio II auctior. Stockholmiæ, Gottfr. Kiesewetter.*

Bartram's copy of this book is in possession of the Pennsylvania Historical Society; on the title page is the writing:

"John Bartram His booke sent to him by Dr. Gronovius in ye year 1746."

That it is authentic is shown by the following, also written in the book: "I bought this book June 14, 1853, at the sale at Mackey's of Books of Col. Carr, who married Bartram's grand-daughter." E. D. Ingraham. "I bought this book March 20, 1855, at the sale of Mr. Ingraham's Library by M. Thomas & Sons." A. Day.

†1753-61. P. KALM—*En Resa til Norra America.* Stockholm, III vols.

1754-64. KALM—*Beschreibung der Reise nach dem nördlichen Amerika.* Göttingen. 3 Theile (German translation).

DEVIL'S POOL, WISSAHICKON CREEK
(circa 1885).

UNIVERSITY OF ARIZONA
LIBRARY

bly the first professor of botany in America, appointed in 1768 to the chair of botany in the University of Pennsylvania. He had the advantage of studying under the illustrious Swede, and was said to have been a favorite pupil (Linnæo ex discipulis acceptissimus). John Bartram next becomes pre-eminent as a botanist. In the latter end of the year 1785, Humphrey Marshall published his Arbustum Americanum,* a description of the trees and shrubs native of the United States. It is the first strictly American botanical work. In 1791 William Bartram's Travels † appeared, and in 1801 André Michaux's ‡ "Oaks of North America." Two years later, in 1803, the first elementary work on botany by Prof. B. S. Barton, § was published in Philadelphia.

F. André Michaux, ‖ in 1810, issued his splendid history of the Forest Trees of North America (Histoire des Arbres Forestiers de l'Amérique Septentrionale) with elegantly colored plates. An excellent catalogue of the native and naturalized plants of North America was published by Dr. Henry Muhlenberg at Lancaster, in 1813.¶ Later, Frederick

*1785. HUMPHREY MARSHALL—*Arbustum Americanum, the American grove or an alphabetical catalogue of forest trees and shurbs, natives of the American United States.* Philadelphia.

†1791. WILLIAM BARTRAM—*Travels through North and South Carolina, Georgia, East and West Florida, etc., containing an account of the soil and natural productions of those regions.* Philadelphia.

‡1801. ANDRE MICHAUX—*Historie des chênes de l'Amérique, ou descriptions et figures de toutes les espèces et variétés de chênes de l'Amérique septrionale.* Paris (folio).

§1803. B. S. BARTON—*Elements of Botany; or outlines of the natural history of vegetables.* Illustrated by forty plates. Philadelphia.

‖1810. FRANCOIS ANDRE MICHAUX—*Histoire des arbres forestiers de l'Amérique septentrionale, considérées principalement sous les rapports de leur emploi dans les arts et de leur introduction dans le commerce, ainsi que d'apres les avantages, qu'ils peuvent offrir aux gouvernements en Europe, et aux personnes, qui veulent former de grandes plantations.* Paris.

¶1813. MUHLENBERG—*Catalogus Plantarum Americæ Septentrionalis huc usque Cognitarum, Indigenarum et Cicurum;* or, a Catalogue of the Hitherto Known Native and Naturalized Plants of North America. Arranged according to the Sexual System of Linnæus. Lancaster, 1813. Wm. Hamilton, octavo, pp. iv., 112.

Pursh published in London, in 1814, his valuable and comprehensive work, Flora Americæ Septentrionalis.*

Arranged according to the Linnæan system there appeared in 1818, in two volumes, Dr. William P. C. Barton's† Compendium Floræ Philadelphicæ, a hastily digested, but thoroughly useful hand-book of the region.

Botanical works and papers began now to multiply, and the third period of Philadelphia botany was fairly entered upon with the publication in 1818 of Nuttall's "Genera of North American Plants," at Philadelphia.‡

(3) Development of the Natural System under the influence of the doctrine of the constancy of species. A new direction to the study of systematic botany, and morphology was given in France, where the sexual system had never met with great acceptance. Bernard de Jussieu and his nephew, Antoine Laurent de Jussieu, taking up Linnæus' profounder and properly scientific efforts, made the working out of the natural system, in Linnæus' own opinion the highest aim of botany, the task of their lives. The key was given by the study of the order Ranunculaceæ in the Jardin des Plantes. In 1789 Jussieu's System appeared. It was not until 1815 that the natural system of Jussieu was received by the botanists of Philadelphia. In that year Abbé Correa published for the use of his class in Philadelphia a reduction of the genera of Muhlenberg's Catalogue according to the system of Jussieu. This was

*1814. PURSH—*Flora Americæ septentrionalis, or a systematic arrangement and description of the plants of North America.* London, II vols.

†1818. W. P. C. BARTON—*Compendium Floræ Philadelphicæ, containing a description of the indigenous and naturalized plants found within a circuit of ten miles around Philadelphia.* Philadelphia, II vols. 8. I. Preface 251 pp. II. 234 pp. cum indices.

‡1818. NUTTALL—*The Genera of North American Plants, and a catalogue of the species of the year 1817.* Philadelphia, II vols.

appended to a second edition of the catalogue issued in 1818 by Solomon Conrad, and was probably the first attempt in the United States to group our plants by the natural method.

In 1826, in conjunction with some of his intimate friends, Dr. William Darlington, of West Chester, assisted in organizing the Chester County Cabinet of Natural Science, of which institution he was president from its origin; in the same year he published his "Florula Cestrica,"* being a catalogue of plants growing around the borough of West Chester, Pennsylvania. This paved the way for a large and more comprehensive manual of the botany of Chester County, which appeared in 1837 under title of "Flora Cestrica."† A third edition of this book appeared in 1853. This work at the time of its issue was one of the most complete local floras extant, and is still a model for all works of a similar character. The descriptions are clear, lucid and minute, and its use even to-day is not replaced by a manual of more modern issue.

The study of the cryptogams received a great impetus at the hands of Lewis D. von Schweinitz, who published in 1831 a synopsis of North American fungi, "Synopsis Fungorum in America Borealia Media Digentium."‡

Elias Durand, one of the most acute systematists of his

---

*1826. DARLINGTON—*Florula Cestrica: an essay towards a catalogue of the phœnogamous plants, native and naturalized, growing in the vicinity of the borough of West Chester, in Chester County, Pennsylvania, with brief notices of their properties and uses in medicine, rural economy and the arts.* West Chester, 4 min., pp. xv., 152, 3 tab. col.

†1837. DARLINGTON—*Flora Cestrica: an attempt to enumerate and describe the flowering and filicoid plants of Chester County, in the State of Pennsylvania.* West Chester, 8. xxiii, 640 pp. 1 map col.

‡1831. SCHWEINITZ—*Synopsis Fungorum in America Borealia Media Digentium.* Trans. Amer. Philos. Soc. N. S., IV p. 141 (177 pp., 4to., 1 plate).

day, who, if he had had proper encouragement, would have been one of the shining lights in the botanical firmament, contributed several botanical papers to the *Journal of the Academy of Natural Sciences*, namely, descriptions of Heermann's and of Pratten's collections.*

The views of European botanists were undergoing a change under the influence of the history of development and knowledge of the minuter anatomy and embryology of the cryptogams (1840–1860). Schleiden's "Grundzüge der wissenschaftlichen Botanik" † appeared, but its chief title is Die Botanik als inductive Wissenschaft, which indicates the point on which Schleiden laid most stress. His great object was to place the study, which had been so disfigured in the text-books, on the same footing with physics and chemistry, in which the spirit of genuine inductive enquiry into nature had already asserted itself in opposition to the nature-philosophy of the immediately preceding years. This change in European thought does not seem to have had much effect on the botanists of Philadelphia, who were busy in working up the plants collected in various parts of North America, both by private individuals and by the botanists of the trans-continental surveys.

(4) The year 1860 may be said to mark the beginning of the modern era of botany. Darwin's Origin of Species,‡

* PLANTÆ HEERMANNIANÆ—*Descriptions of New Plants collected in South California, by Dr. A. T. Heermann*, Naturalist attached to the Survey of the Pacific Railroad route, under Lieut. R. S. Williamson, by E. Durand and Theo. C. Hilgard. Journ. Acad. Nat. Sci. 2nd ser., III, 37-46.

†1842-43. SCHLEIDEN—*Grundzüge der wissenschaftlichen Botanik, nebst einer methodologischen Einleitung als Anleitung zum Studium der Pflanze.* Leipzig. 2 Theile.

1845-46—Second edition. (Die Botanik, als inductive Wissenschaft behandelt.)

‡1859. DARWIN—*On the origin of species by means of natural selection; or, the preservation of favored races in the struggle for life.* London. John Murray octavo pp. ix., 502.

published in 1859, was an epoch-making book. It introduced the modern period of scientific thought.

With the exception of Thomas Meehan, Joseph T. Rothrock, Thomas C. Porter, Charles Pickering, John H. Redfield, Thomas P. James, Benjamin M. Everhart, Rev. Francis Wolle, Mary Treat, William P. Wilson, J. Gibbons Hunt, Emily L. Gregory, John M. Macfarlane, Job B. Ellis, George Rex, H. C. Wood, Henry Trimble, Edson S. Bastin, Ida Keller, Henry Kraemer, J. W. Harshberger and H. C. Porter, very few of the Philadelphia botanists have advanced materially the science of botany according to the progress made in morphology, physiology and taxonomy. The others have unfortunately given their attention to herborizing, and have overlooked the deeper and more interesting problems which are still to be worked out, such as the reasons underlying the geographical distribution of the plants in the region, phenological inquiries or the philosophy of the time of flowering; physiological problems suggested by growth and development, and ecological questions suggested by the environmental conditions. It is to be hoped, however, that with the modern training to be had at several institutions of learning, our botanists will give up discussing the differences between species already described and will devote their energies to advancing modern botanical thought. The facilities for those who desire to obtain a modern botanical training are many. The oldest botanical centre, namely, the University of Pennsylvania, presents, in its Biological School, a place where such instruction may be had.

A history of the development of botany in connection

with the University of Pennsylvania is interesting.* "So far as now appears, Dr. Adam Kuhn, a pupil of Linnæus, was the first botanical professor in Philadelphia, or in the country, being appointed in the year 1768. There is, however, no record of any important work connected with his name. As early as the year 1800, Dr. Benjamin Smith Barton was teaching botany in Philadelphia, and numbered among his pupils in 1803–'04, at the University of Pennsylvania, William Darlington, who subsequently became known as one of the most learned and exact botanists of his day in this or any other country. Dr. Darlington says of his preceptor, 'that he did more than any of his contemporaries in diffusing a taste for the natural sciences among the young men who then resorted to that school.' He also published in 1803 'the first American elementary work on botany, at Philadelphia.'"

"The minutes of a trustee meeting held April 7, 1812, show that 'a letter was received from Dr. Barton requesting the use of one of the rooms in the University to deliver his lectures on natural history and botany in.' The request could not be granted. In July, 1813, Dr. Barton resigned his professorship of materia medica, a position which does not appear to have been a bed of roses. He was succeeded by Dr. Chapman. The following minute appears of a trustee meeting of November 7, 1815:"

"*Whereas*, the Legislature of Pennsylvania, by their Act passed the 19th March, 1805, granted to the trustees of this institution out of the moneys due to the State, the sum of three thousand dollars, for the purpose of enabling them

*I have drawn largely at this point on Dr. J. T. Rothrock's sketch of the Biological School, published in the Circular of Information Bureau of Education, entitled, "Benjamin Franklin and the University of Pennsylvania" (1893).

SYSTEMATIC BEDS AND INSTITUTE, UNIVERSITY BOTANIC GARDEN
(LOOKING WEST IN 1896).

UNIVERSITY OF ARIZONA

POND, UNIVERSITY BOTANIC GARDEN (LOOKING SOUTH).

UNIVERSITY OF ARIZONA

to establish a garden for the improvement of the science of botany, *Resolved*, that Mr. Rawle, Mr. Chew and Mr. Burd be a committee to consider and report the best method of carrying the said intention of the Legislature into effect."

"February 6, 1816, at a trustee meeting Mr. C. S. Rafinesque and Dr. William P. C. Barton offered themselves as candidates for the professorship of natural history and botany in the University. Dr. Barton was appointed."

"The trustees received March 19, 1816, 'a letter from a society of gentlemen called the Cabinet of Sciences, relating to a botanical garden. It was referred to the committee on that subject. Mr. Binney and Mr. Gibson were added to the committee on botanical garden.' On April 2, the committee was authorized to solicit subscriptions from the public towards the accomplishment of that end. Nothing having been accomplished by meeting with the Cabinet of Sciences, on April 16 the committee announced that they had published their application for aid in the public papers. By order of the board, the moneys available for the botanical garden were put at interest, subject to future call. Early in 1817 forty-two acres of ground had been purchased for the botanical garden. The records show that it was located in Penn Township, near the 'Canal Road,' and it was ordered that enough for the purposes of the garden should be 'fenced off.'"

"Stringent economy had apparently become a necessity, and in 1819, after two years' ownership, the trustees were considering the propriety of selling the ground purchased for a botanical garden, and the professor of botany was 'allowed the use of the yard south of the University, as the same is now inclosed, for the cultivation of plants there, at his own expense, during the pleasure of the board.'"

"On October 4, 1818, the faculty of natural history was instituted, and the following professorships created: First, botany and horticulture; second, natural history, including geology, zoology, and comparative anatomy; third, mineralogy, and chemistry, as applied to agriculture and the arts."

"The only signs of life in 1820 in the department of science were now the appointment of a committee to consider the propriety and the cost of erecting a greenhouse, and the request from the janitor that he be allowed the use of Prof. Cooper's room for the winter, to preserve the plants 'he had collected to adorn the grounds and to encourage the love of botany.' The request was granted. The report of the committee on the greenhouse was laid on the table."

Prof. Barton, in 1822, writes to the board that he had lectured in the winters of 1816, 1817, 1818, 1819, 1820, 1821, and further, that he had refused to receive the fees from the students. The botanical instruction in 1821 was discontinued because a class could not be formed. The crisis in the school of natural history, however, was reached in March, 1827. It appears that no lectures had been given for several years by the professor of natural history, including geology, or by the professor of comparative anatomy, and that the professor of botany was then holding the professorship of materia medica in the newly-started Jefferson Medical College. Early in 1828 the faculty of natural history was abolished.

"Now, however, it appears that the medical faculty, which would have no botany while Dr. Barton occupied the chair, had become suddenly solicitous about that science, and, as a result, the trustees re-established the chair of botany in 1829, placing it on the same footing as it was

UNIVERSITY BOTANIC GARDEN (LOOKING TOWARD BIOLOGICAL SCHOOL).

UNIVERSITY OF ARIZONA
LIBRARY

before the institution of the faculty of natural science, and Mr. Solomon W. Conrad was speedily chosen to fill it. The appointment was probably the best that could have been made." Mr. Conrad, who died in 1831, was, as stated by one of his contemporaries, an "amiable man," and an "excellent botanist," was probably the earliest to "attempt to group our plants by the natural method."

Dr. George B. Wood was elected to the chair of materia medica in the University in 1835. In addition to the creation of an admirable cabinet of drawings and specimens illustrative of materia medica, Dr. Wood erected a spacious greenhouse, in connection with a garden, and stocked them with many varieties of rare tropical and exotic plants, which he exhibited as illustrations of the subjects treated in his lectures. In 1865 Dr. Wood endowed an auxiliary faculty of medicine in the University of Pennsylvania, including a chair of botany, to which his nephew, Dr. Horatio C. Wood, was appointed in 1866. He held this professorship for ten years, resigning the chair of botany for that of materia medica and therapeutics, made vacant by the death of Prof. Joseph Carson. Dr. Joseph T. Rothrock was elected to fill the vacancy caused by the removal of Dr. H. C. Wood to the chair of materia medica and therapeutics, a position which he still holds. Botany, under his direction, received a great stimulus, when on December 4, 1884, the School of Biology, erected by the liberality of Dr. Horace Jayne, was opened to students. Teaching began at once, with modern biological methods. Later Dr. William P. Wilson was appointed Professor of the Anatomy and Physiology of Plants, in conjunction with Dr. Rothrock, who devoted himself to the systematic side

of botany. All of the departments of botany, since the establishment of the school, have received consideration at the University. Morphology, taxonomy, physiology, paleobotany, economic botany, forestry, pathological and geographical botany, have been taught at various times; chief stress, however, being laid on morphology, taxonomy and physiology, as the departments of botany most necessary to students. A post-graduate class in botany, composed of student candidates for the degree of doctor of philosophy, has been maintained. The teaching force of late years, consisting of Drs. Rothrock, Wilson, Macfarlane, Harshberger and Porter, has maintained the standard desirable in a modern school of botany.

The Herbarium of the University, through the generosity of Mr. Isaac Burk, possesses a singularly complete representation of the flora of the vicinity of Philadelphia, consisting of about six thousand specimens from this and other localities. Mr. Aubrey H. Smith presented by will his excellent herbarium, which, with the collection made by the late Joseph Leidy, forms a most excellent working herbarium. Many specimens from the earlier government expeditions, and suites of the collections made by Parry, Hall, Barbour, Vasey, Bolander, Palmer, Lemmon, Canby, Ward, Pringle, Bebb, Wolfe, Curtis, Reverchon, Rothrock, Harshberger and others, are represented. The herbarium also contains a large proportion of our native ferns, mosses and lichens, and over two thousand species of fungi, all of which have been carefully determined. A museum of economic botany was started by Dr. Rothrock in connection with the School of Biology, and further additions were made in material collected on his cruise to the West Indies in the winter of 1889-1890.

The University Botanic Garden was begun with the erection of the building for the School of Biology. It consisted, in 1888, of about a quarter of an acre of ground immediately surrounding the Biological School, planted with a few systematic and experimental beds. The planted grounds were surrounded by high gravel banks, overgrown with weeds. It was not until 1890, when a large part of this glacial gravel deposit had been sold and carted away, that the botanic garden may be said to have had its inception. Dr. Joseph T. Rothrock, Professor of Botany, supervised the laying out of the ground to the east and west of the laboratory, which was planted to grass, with trees and shrubbery arranged for landscape effect. A tank pond of considerable size was also built for the growing of various water-plants. A lean-to conservatory for the growth of hot-house plants was also a feature of the garden at this time. The ground, as laid out by Dr. Rothrock with systematic regard to the position of the plants, included finally about an acre of ground surrounding the laboratory building. Several rare shrubs were set out, among them, *Neviusia Alabamensis*, an anomalous rosaceous plant found growing wild in the Southern states. The grass plots, shrubbery and systematic beds then occupied a terraced depression fronting on Pine Street.

The development of this garden, however, took place when Mr. C. C. Harrison accepted the provostship of the University. In 1893, immediately after his appointment to be Professor of Botany, Dr. John M. Macfarlane submitted plans for the establishment of the botanical garden, on the triangular piece of land back of the biological laboratory. Various circumstances conspired to prevent the carrying

out of these plans until the autumn of 1894, when Dr. Macfarlane was asked to become Professor-in-Charge of the Biological School. Through the fostering care of Provost Harrison and Vice-Provost Fullerton, the work steadily advanced under the direction of Prof. Macfarlane. The gravel bank, overgrown with weeds, rapidly assumed its present pleasing appearance.

There are over 3000 distinct specimens growing in the gardens, while nearly 1500 more are all but ready for planting. The lawns are 300 feet in length, the eastern lawn being 157 feet long and 110 feet wide, subdivided into 44 small beds, whose dimensions are 45 feet in length by $3\frac{1}{2}$ feet in width. The western lawn is an almost exact counterpart of the eastern lawn. The beds contain a large number of species of plants, arranged systematically according to the Engler and Prantl system. The plants are arranged and labeled with the scientific and common name, the native place or habitat and the medicinal property, if any. The donations of seeds and plants to the garden include gifts from the botanical gardens of Edinburgh, St. Petersburgh, Dublin, Jena, Cambridge and other European botanical centres. On the terraced area further back a physiological grouping of flowering plants is now being made. Here separate beds are given to climbing, tendril-bearing, succulent, spiny, insectivorous, variegated and other series. Thus similar changes produced by environment on species that have no systematic affinity can be graphically demonstated to the student.

The arboretum is from three to five acres in extent, and will only be excelled by those of Harvard University and the Shaw Gardens, near St. Louis. The greater part of the

VIEW IN THE PALM HOUSE, UNIVERSITY BOTANIC GARDEN.

UNIVERSITY OF

property will be devoted to the arboretum, which already contains a number of trees of interest and beauty. These are planted in systematic order along the drive-way which enters on Woodland Avenue and encircles the garden. A magnificent, ornamental bed, fashioned somewhat after the beautiful bed in the famous Kew Gardens, in London, is a feature. It is 200 feet long and 8 feet wide, and is filled with herbaceous plants. Unlike the series of small beds before referred to, it will not be a scientific feature, but will be the chief ornament of the gardens. The plants are so arranged as to present a succession of flowers from early spring to late fall.

The contractor in excavating left a deep cut in which the pond, bog garden, iris bed, rockery and fernery are situated. The pond, of irregular shape, this last season (1898) was filled with a splendid growth of aquatics, water lilies, lotuses and water hyacinths being conspicuous, while the aquatics, *Marsilia quadrifolia*, *Myriophyllum*, *Nitella*, *Chara Limnobium*, *Limnocharis* and *Trianea bogotensis* grew luxuriantly. The bog garden is situated along the ditch connecting the Victoria tank and the lake. In separate pockets formed by stones set on end are grown plants which flourish in a water-logged soil, such as *Decodon verticillatus*, *Acorus calamus*, *Typha latifolia*, *Sparganium eurycarpum*, *Drosera rotundifolia*, *Sarracenia purpurea*, *S. flava*, *Helonias bullata*, *Orontium aquaticum*, species of *Carex*, of *Cyperus*, of *Sagittaria*, of *Juncus*, and a host of others too numerous to mention. The iris bed adjoins the bog garden, and is connected with it by a pipe through which a water supply is furnished to the roots of the plants. The rock garden covers the sides of the cut in which the lake is situa-

ted, and is provided with separate pockets for every plant after the rockery in the botanic garden at Edinburgh. Here are grown a large number of rock plants and herbaceous ones of a gaudy color. Narrow pathways intersect the rock garden in every direction, so that a person can study the plants closely, as well as in mass. The fernery, hardly yet thoroughly established, is in a glen through which runs a cindered path under trellis-work devoted to climbing plants, intended to protect the delicate ferns beneath. Nearby is the Bryarium for the growth of mosses.

The surrounding shrubberies have been laid out so as to illustrate geographic groupings of plants. One is devoted to the swamp shrubs of the eastern States, such as the white azalea, white birch, spice brush, swamp magnolia, andromedas, huckleberries, cedar and juniper. Another includes the rhododendrons, azaleas and kalmias of our woods. Under the shade of these, native and introduced herbaceous plants thrive, that would soon shrivel if exposed to hot suns.

Through the generosity of Provost Harrison important additions were made to the plant houses at the close of the season of '97. These houses now represent more than 9000 feet of glass surface, and consist of eight houses in addition to propagating frames. One of the greenhouses, immediately connected with the laboratory for plant physiology, is in part utilized as a temperate house, in part for the work of students in plant physiology. An adjoining house, 34 × 11 feet, is arranged as a fernery, and contains a representative collection of ferns and their allies. Opening from the last are a propagating house, 40 × 10 feet, a stove house, 46 × 18 feet, and a palm house, 59 × 28 feet. The two last now

VIEW IN THE PALM HOUSE, UNIVERSITY BOTANIC GARDEN.

UNIVERSITY OF ARIZONA
LIBRARY

contain a varied collection of pitcher plants, aroids, melastomids, sensitive plants, palms, marantas, bananas, bamboos, etc. To the right of the palm house is a succulent house containing a type collection of cacti, euphorbias, gasterias, aloes, agaves, crassulas and other forms that are more or less similarly modified to live in arid regions and successfully resist long periods of drought. On the left side of the palm house are two structures, each 59 × 13 feet. The inner of the two now contains a fair collection of sub-tropical and tropical orchids donated by Mr. LeBoutillier, and more recently by Mrs. George Wilson. Sharing the house with these are parent species and hybrid derivatives of the popular begonias and gloxinias, as well as specimens of the curious South African genus *Streptocarpus*, two species of which show only one of the two seed leaves, though this may attain a length—as in one specimen exhibited in the greenhouses—of two to three feet. Species of *Oxalis* and *Solanum*, the curious simple-leaved *Chorizema* from Australia, and many other sub-tropical types of great value in undergraduate and graduate teaching find a home here. The outer or cool house lodges many plants of great botanical interest, chief among these being the celebrated venus fly-trap, several native sundews, groups of our southern sarracenias, and the butterworts, all celebrated as fly catchers. Recently, by permission of the highway authorities of the city of Philadelphia through a municipal act, Pine Street, between Thirty-eighth and Thirty-sixth Streets, has been taken from the city plans. The area thus vacated has been converted (1898) into a fine walk lined with trees, shrubs and rhododendrons. At the Thirty-ninth Street entrance a memorial gate-way, in keeping with the dormitory building

adjoining, has been erected by the Class of '73. A vivarium or building for small animals is in course of erection in the garden enclosure immediately in the rear and to the west of Biological Hall. A small garden is much better for scientific work than a large one, the cost of maintenance of the latter being considerable. The University garden of five or six acres is therefore admirably adapted to its purpose, being near to the laboratory where the botanical instruction is given. The illustrations will convey better than words the appearence of the garden after it had been planted in 1896, and again after the construction of the greenhouse additions and vivarium in 1899.

The Botanical Society of Pennsylvania was instituted at the University of Pennsylvania, October 23, 1897. Under its auspices a fortnightly series of popular meetings and of scientific meetings have been held since organization, while during the fall, spring and summer, courses of laboratory demonstrations and field excursions have been held. A great variety of interesting papers were presented during the first year of the society's existence. Living plants from various greenhouses, charts, diagrams, lantern slides and specimens added very much to the attractiveness of the several meetings. The class meetings were held at the Biological Hall of the University, where the greenhouses and garden afforded much interesting and valuable material. The general meetings were held in the auditorium of the Harrison Chemical Laboratory. The following persons have interested themselves in the movement: Dr. John M. Macfarlane, Professor of Botany; Dr. Henry Kraemer, Messrs. Roberts LeBoutellier, W. H. Walmsley, Drs. A. W. Miller,

BOG AND ROCKERY, UNIVERSITY BOTANIC GARDEN
(LOOKING NORTH IN 1896).

UNIVERSITY OF ARIZONA
LIBRARY

H. C. Porter and J. W. Harshberger. A list of the active members of the society is given in an appendix.

The Philadelphia College of Pharmacy has also been an influential botanical centre. Several excellent botanists have occupied the chair of materia medica and botany, as John M. Maisch, Edson S. Bastin, Henry Kraemer and Clement B. Lowe. The chemical and pharmaceutical side of botany have been much emphasized, and much meritorious work has been done, both by the chemists and botanists of the institution. *The American Journal of Pharmacy* is a valuable epitome of the work accomplished.

The late Professors Trimble and Bastin, of the faculty, were actively engaged in botanical research, the former on the tannins of plants, the latter on the coniferæ and the resins. From the College of Pharmacy many students have received an inspiration for botanical study. The Herbarium of the Philadelphia College of Pharmacy possesses the collections of Elias Durand, Daniel B. Smith, Prof. John M. Maisch, and that of Isaac Martindale, purchased by Messrs. Smith, Kline, French and Company from the estate, as also numerous contributions from botanical friends and students. With a laboratory equipped for botanical and microscopical study, and with such an excellent herbarium for comparison, the College is enabled to give an extended course in botany.

The Academy of Natural Sciences of Philadelphia was founded March 21, 1812, by a few citizens "interested in the study of the works and laws of the Creator." From the outset, the Department of Botany received a due share of attention, and the first contribution to the Academy's Herbarium * consisted of a collection of plants made in the

* Torrey Bulletin VIII: 42, J. H. Redfield.

environs of Paris and presented by Nicholas S. Parmentier, and still in excellent preservation. During the years which followed, this little nucleus received constant accretions from the working botanists of the day, and the names of Collins, Elliott, Pursh, Baldwin, LeConte, Conrad, Nuttall, Torrey and Pickering are inscribed on many of the early tickets of the Herbarium.

In 1834 the Academy received the bequest of the collections made by Rev. Lewis David von Schweinitz during a period of forty years. Most of the northern species were collected by himself, but many came from Dr. Torrey, Major Le Conte, Rev. Mr. Dencke, and other correspondents. The European species were contributed by Weldon, Bentham, Brongniart, Schwaegrichen, Steudel and Zeyher. The Siberian plants were furnished by Ledebour, and those of India by Wallich and Steinhauer. Many Chinese species were collected by Mr. James Read, and from the Arctic regions were plants collected by the navigator Parry, and received through Sir William Hooker; while from South America were rich collections made by von Martius, Huffel, Hering and Baldwin. Perhaps the most valuable portion of the bequest consisted of the extensive series of the lower cryptogams, of which Von Schweinitz had made a special study.

Other valuable contributions followed the bequest of Von Schweinitz, among which may be specified the Poiteau collection of St. Domingo plants; Chilian plants from Dr. Styles and Dr. Ruschenberger; Nuttall's collections made in his expeditions to Arkansas, Oregon and the Sandwich Islands; Menke's Herbarium of 7000 species of European plants derived from Thunberg, Sprengel, Bernhardi,

GROUP OF SARRACENIAS BY THE POND, UNIVERSITY BOTANIC GARDEN.

UNIVERSITY OF ARIZONA
LIBRARY

Treviranus, Mertens, etc.; the Ashmead collection of marine algæ; Lesquereux's collection of over 700 species of algæ, authenticated by the best algologists of the age, and a large collection of cryptogams from Ravenel. More recent additions are the herbaria of the late Thomas G. Lea, of Cincinnati, and of Dr. Joseph Carson, late Professor of Materia Medica in the University of Pennsylvania; a large collection from southern Europe and from India, made by the late John Stuart Mill, received from Miss Taylor, through the Director of the Kew gardens and the kindness of Dr. Gray; the collections of the late Dr. Charles Pickering, made in his journeys through oriental regions in 1844 and 1845; Syrian and Algerian plants from Dr. George Post, of Beirut; Floridan plants from Dr. Garber; Mexican plants collected by Parry, Palmer, and Pringle, and a set of mosses and hepaticae of North America, collected and named by the late Col. F. Austin.

The most important accession to the Academy's collection was the Short Herbarium of Dr. Charles W. Short, of Louisville, Ky. For this the Academy was indebted to the strenuous exertions of Dr. Gray in its behalf, and to the liberality of Dr. Short's family. The plants of this collection are uncommonly choice specimens, from all active collectors up to 1863, and are laid in sheets of extra size, arranged in 325 book-form cases, of which the North American species occupy 261, and the exotic species 64.

The work of arranging the earlier collections of the Academy was mainly accomplished by Nuttall and Pickering, followed later by Goddard, Bridges, Zantzinger, Durand, Burk, Scribner, Redfield, Smith, Brown and Meehan. Until the removal to the new building, in 1876, the arrangement

had been after the Linnæan system in large cumbersome port-folios, in a narrow, dark and inconvenient hall. The removal gave opportunity for an entirely new arrangement, more in accordance with the progress of the science, on enclosed shelves after the most approved modern methods, and in well-lighted apartments convenient for reference and study.

In 1854, the lamented Elias Durand began the work of forming a special North American Herbarium from the stores of the Academy, contributing largely from his private collection, of species collected by Lindheimer, Fendler, Wright and others. In this labor he was occupied four years. Since his death the work of perfecting this department has been continued, and nearly all of the collections made in our newer territories by Parry, Lemmon, Palmer, Kellogg Ward, Rothrock, Pringle and others have been contributed at various times by Gray, Canby, Parker, Meehan, Rothrock, Martindale and Redfield. This collection and the "Short Herbarium" occupy the upper of the two rooms devoted to botany in the south-west corner of the building, while the lower room contains the general herbarium, and a large case devoted to the reception of fruits, seed vessels and other vegetable productions.

One of the most recent additions to the Academy's Herbarium is the loan collection of the Lewis & Clark plants from the American Philosophical Society. The following is an interesting account of this recent acquisiton:

"The expedition of Captains Merewether Lewis and William Clark, from what was then the village of St. Louis to the sources of the Mississippi and across to the Pacific Coast, was one of the marvels in the early history of the American

DRIVE-WAY, UNIVERSITY BOTANIC GARDEN (LOOKING NORTH).

UNIVERSITY OF ARIZ
LIBRARY

Republic.* Captain Lewis started from Washington to take charge of the party on the 5th of July, 1803. They crossed the Continent, reaching the mouth of the Columbia River, and with the loss of but one man, returned and arrived at St. Louis on the 23d of September, 1806.

"The idea of exploration originated with Jefferson. In 1792 he tried to interest the American Philosophical Society in the plan. It was approved, and it was decided to place the expedition in charge of André Michaux. Reasons of State policy arising out of our relation with Michaux's country, caused its abandonment. Lewis was Jefferson's private secretary, and under him the expedition finally started."

The plants collected on the expedition were described by Pursh in his "Flora Americæ Septrionalis," published in London, in 1814. One hundred and nineteen (119) plants are referred to, many of which he described as wholly new.

Nothing was known as to the final disposition of the collections. It was lost to botanists. "It was understood that Pursh took these plants to England, and that they were left by him to Mr. A. B. Lambert, Vice-President of the Linnæan Society, under whose roof and by whose aid Pursh's great work was completed. Lambert's Herbarium was finally distributed, and, in some way not known to the writer, a number of Lewis's plants, forming Pursh's types, and marked 'from Lambert's Herbarium' became part of the herbarium of the Academy of Natural Sciences of Philadelphia."

"Two years ago Professor C. S. Sargent suggested to the writer the possibility of some of the material being yet in

*1898. MEEHAN—Proc. Acad. Nat. Sci., p. 12.

the custody of the American Philosophical Society. After long and diligent search, packages of plants were found which could only be these, as the localities on the label slips were about the same as those given in Pursh's work." After a careful scrutiny of the labels, handwriting and plant sheets it was satisfactorily determined by Mr. Meehan that the plants were those of Lewis and Clark. Pursh had evidently studied these collections before starting to Europe with them, leaving duplicates, where there were any, and those which were too imperfect to be easily recognized. A comparison of Lewis's own labels and Pursh's copies shows that the latter were not always strictly copied—differences can be seen in the comparisons made in the catalogue. Pursh's notes were probably made from Lewis's original memoranda carried away with the specimens, and are, therefore, the more likely to be the exact statements of the collectors, than the copies left with these. The plants first determined by Mr. Meehan were turned over to the Gray Herbarium where they were critically studied by Messrs. Robinson and Greenman.

With the freedom of three-quarters of a century the museum beetles had made sad work in the bundles. In a few cases the specimens had been wholly reduced to dust, and only fragments were left in other cases. Generally, however, they were in fair condition. The Philosophical Society wisely accepted a proposition to deposit these and other collections with the Academy of Natural Sciences, where they would be properly cared for. All these collections, including those from the Kuram Valley, Afghanstan, made by Major J. E. T. Aitcheson; from China, Japan, Formosa, Australia and Tasmania; from the Texo-Mexican

region; from Australia, made by Baron F. von Mueller; from the United States Forestry Commission of rare North American trees; from North Africa, made by Geo. Curling Joad; from the North Pacific Survey, by William Canby; from Alaska, by Thos. Meehan; from the Yellowstone, made by F. Tweedy; of Mexican plants distributed by C. G. Pringle, the noted collector, and the veteran botanist, Dr. Palmer; from Colorado, New Mexico and California, made by A. H. Smith; from Chili, Bolivia and Brazil, distributed by H. H. Rusby; from Tabasco and Chiapas, in Mexico, by Prof. Rovirosa; from South America, by Thos. Morong; from the West Indies, made by Professor Leopold Krug, of the Royal Botanical Museum, Berlin; from Guatemala, distributed by John Donnell Smith; from Greenland, made by Wm. E. Meehan; from Greece, Macedonia, Asia Minor, Kurdistan and Mesopotamia, by Bornmüller and Sintenis; from the West Indies, distributed by Rothrock; from California, by Brandegee, are valuable scientifically, because they represent type specimens of the new forms discovered by all of these collectors in different parts of the world. In addition to the phanerogams the Academy's herbarium has been enriched in recent years by the addition of many noteworthy cryptogamic collections, among these may be mentioned a complete set of Ellis's "Centuries of North American Fungi," Drummond's "Mosses of the Rocky Mountains and British America," a set of fungi, from the wife of the late Dr. Geo. Martin, of West Chester; the lichen herbarium of Dr. J. W. Eckfeldt, the celebrated lichenologist, and other collections of minor interest and importance.

With these large collections the herbarium of the Academy of Natural Sciences may be said to be on a par

with those of Harvard University, at Cambridge, Mass.; Columbia College, in New York; the Missouri Botanical Garden, at St. Louis, and the United States Department of Agriculture, at Washington.

In addition to the herbarium, the Academy is especially fortunate in having an almost complete file of all of the leading journals of science, in which list the botanical journals are well represented. The Academy, therefore, is well equipped for active scientific work, but is hampered, like so many other institutions, by lack of funds. It is to be hoped that the endeavor which is now being made to raise an endowment to pay a first-class botanist, and to maintain the herbarium in good condition, will meet with success. The fund, to be known as the Redfield Memorial Herbarium Fund, is sorely needed, as the committee, consisting of Thomas Meehan, George M. Beringer, and Stewardson Brown, testify in their appeal to the admirers of the scientist who did so much for the herbarium.

It is estimated that at least $30,000 should be raised to insure the necessary income, and the bequest * of Mr. Redfield will serve as a nucleus. It is proposed to utilize the interest to pay a conservator or professor, who shall devote his time to the needs of the herbarium, and make the collections available at all times. Any income in excess of the sum needed for salary will be judiciously applied to shares in exploring expeditions, or other means of adding to the collections.

The Philadelphia Botanical Club, organized by Dr. J. Bernard Brinton, who held the presidency until his death, has for its object the promotion of social intercourse between

* See Science N. S. I: 470; also *Philadelphia Ledger*, April 2, 1895.

botanists who live within a radius of sixty miles of the City of Philadelphia, the formation of a herbarium in which all of the plants of the region, carefully mounted, labeled and annotated, are represented, and the advancement of botany generally. Field trips during the spring, summer, and autumn months are taken to various points of botanical interest, and reports are made at each succeeding meeting of the plants collected. Its membership represents the active botanists of the region at the present day. It has done much to advance the systematic knowledge of the plants of the district. Under the auspices, and with the co-operation of this organization, Dr. Ida Keller has undertaken the preparation of a list of the plants found within the neighborhood of Philadelphia, as represented in a radius of 60 miles or less. This work will be of great use to students of the local flora, and is to be highly commended.

The study of the lower forms of plant-life has been almost entirely neglected by the greater number of botanists mentioned in this work. In order to create an interest in the fungi, especially the higher fleshy fungi, two societies have been inaugurated during 1897 and 1898. One called the Philadelphia Mycological Center, modeled after the Boston organization, meets statedly at the Academy of Natural Sciences. Topics of general interest to the members are discussed, and specimens, chiefly of the edible kinds of toadstools, are presented for inspection.

The other organization is known as the Mycological Club. Its objects are essentially similar to those of the first-mentioned society. A bulletin is published under the auspices of this club, and excursions are taken into the sur-

rounding country for specimens. Those interested especially in the advancement of the interests of this club are the following ladies and gentlemen: Captain Charles McIlvaine, Mrs. S. T. Rorer, Dr. Henry Leffman, Mr. and Mrs. Talcott Williams, and Theodore Rand, C. S. Ridgway, Dr. S. C. Schmucker, and Mrs. Theodore Ely.

The Pennsylvania Forestry Association, organized in 1886, has done a great service to the State of Pennsylvania in interesting its people in trees and in forest preservation. As an outcome of this agitation under the leadership of the Forest Commissioner, Dr. J. T. Rothrock, and by the official organ of the Society, "*Forest Leaves*," three tracts of mountain land have been designated as forest reservations.

The Delaware County Institute of Science at Media, Penna., founded in 1833, has for its object the diffusion of general and scientific knowledge among its members and in the community at large, and the establishment and maintenance of a library and historical record and a museum. The library of the Institute contains about four thousand volumes, covering generally the subjects of science, history and literature. The museum contains a large collection of specimens, illustrating the fauna, flora and the minerals of Delaware County. The local botanical and mineralogical collections are quite complete, well arranged, and accessible to students of these subjects. The Indian archeology of the county is well represented. The Institute is divided into several sections, as follows: biological, anthropological, physical and literary sections.

The Wagner Free Institute of Science, at 17th and Montgomery Avenue, Philadelphia, was founded by William Wagner to advance the cause of science by popular lectures

MAIN HALL, HORTICULTURAL BUILDING, FAIRMOUNT PARK.

UNIVERSITY OF ARIZONA
LIBRARY

and demonstrations. In the past many lectures on botany have been given to interested audiences, under the auspices of the Institute, which also possesses a fine scientific and general library.

Fairmount Park and its Horticultural Building also are places where the botanists of Philadelphia have received their inspiration. This building, in Moorish style, was built for the Centennial Exposition of 1876, and in it was placed a large and valuable collection of palms, orchids, tree ferns, ferns and other tropical and exotic plants. It has been altered considerably since it was built to give more light to the rapidly-growing araucarias, palms and bamboos. A visitor luxuriates in the vegetation of the fernery, the forcing-house, the temperate-house and the main hall, in which grow some magnificent specimens of Australian palm (*Ptychosperma elegans*) tree ferns, bamboos, traveler's tree, date palms, rubber trees, fan palms, climbing aroids, wax palms, and other tropical plants. Upon entering the door, one imagines himself in a tropical forest.

The Commercial and Economic Museum,* which is owned and operated by the City of Philadelphia, is composed of the combined exhibits of many countries, both of raw material and the vegetable and animal products of the countries represented. This museum was established soon after the close of the Columbian Exposition.

Professor Thomas Meehan and Professor W. P. Wilson, made the proposition to procure these great collections to one or two public-spirited gentlemen on September 7, 1893, and on September 12th of that year a resolution was

* *The Mirror*, Philadelphia, Wednesday, May 8, 1895, with portraits of those prominently connected with the Philadelphia Museums.

passed by the Select and Common Councils of the City of Philadelphia authorizing the Park Commission to make collections for an Economic Museum. Later, arrangements were made by Professor Wilson and one member of the Park Commissioners with the Mayor, by which letters were addressed to the foreign representatives at the Columbian Exposition, stating the wish of the City of Philadelphia to obtain the exhibits of natural products at the Fair for the proposed Museum, where they might be preserved intact and so remain as a lasting proof of the advancement of the countries they represent.

On October 19, 1893, Councils passed an ordinance making an appropriation of $10,000 to the Commissioners of Fairmount Park "to defray the expenses of procurement, transportation, packing, storing and display of raw and manufactured economic products now of the Columbian Exposition at Chicago." The sum of $3000 was advanced by three prominent citizens until such time as Councils should make the appropriation. This unexpected generosity saved the enterprise from what might have been a failure, since by that time other cities and institutions, realizing the benefit to their industries to be gained by such a museum, were making attempts to obtain the collections partially promised to Pennsylvania. The appropriation was finally made by Councils, and the money was judiciously expended, $20,000 provided for the project in 1894. Professor Wilson succeeded in securing displays of various materials from Mexico, from Costa Rica, from Guatemala, from British Guiana, from Ecuador, from Colombia, from the Argentine Republic, Brazil, Venezuela, Uruguay, Paraguay, Labrador, Sweden, Germany, Russia, Johore, Japan, Siam, New South

FERN HOUSE, HORTICULTURAL BUILDING, FAIRMOUNT PARK.

UNIVERSITY OF ARIZONA
LIBRARY

Wales, Turkey, British India, Persia, Spain, Puerto Rico and Ceylon.

The objects of the museum are clearly set forth by its promoters as being: First, to bring before American manufacturers all the varied products of the world, that they may make the best selection of material for their own especial interests. Second, to publish all possible scientific and useful information concerning these products which may aid the manufacturer and consumer in his choice. Third, to place on exhibition manufactured articles and samples, with full information from all markets which ought to be entered or controlled, and to furnish to merchants and manufacturers useful information concerning opportunities in foreign lands.

The exhibits consist in the main of raw materials, showing the vegetable and animal products of the several countries, as for instance the handsome forestry exhibit from Mexico, composed of a great number of prepared woods, many of them polished and varnished on one side, showing the grain and any particularly striking features of the wood. There are also minor forest products, such as fibres, gums, resins, tannins and medicinal plants. In many cases the collections represent big sums of money, the exhibition from the Argentine Republic, alone, having cost that government over $25,000. One of the three collections presented from Japan cost $15,000 to prepare. The collections from many of the countries are of especial interest to botanists, in that they comprise largely a display of the vegetal productions of those lands.

The Museum, being in need of a building sufficiently large to accommodate the vast quantity of material in its possession, there were assigned nineteen rooms in City Hall,

all of them except three being in the basement. Many cases were stored in the warehouses of several firms in Philadelphia, awaiting a time when they might be opened.

The exhibits continued in the City Building until September, 1895, when they were taken to South Fourth Street, a lease of the Pennsylvania Railroad Company's Buildings, which are admirably adapted to the purposes of the museum, having been made with the Pennsylvania Railroad Company at advantageous terms in August of that year. The buildings now occupied have been leased for five years, and the exhibits will remain in them until the buildings are completed in West Philadelphia. These railroad buildings are three in number. The principal one is the granite building, fronting on Fourth Street at the corner of Willing's Alley. Adjoining it also on Fourth Street is the Empire Building, three stories in height. Connected with the granite building is the rear of the annex, an enormous structure six stories high. Altogether, the museum occupies 128 rooms with a floor space of 200,000 square feet.

Part of the granite building is devoted to the display of exhibits according to products, without regard to the geographical location of the countries producing them. Here are shown samples from every civilized section of the world, embracing everything of foreign growth used or deemed capable of being used by American manufacturers, or which enter into or are likely to enter into American commerce. The exhibits include thousands of samples of woods, wools, silks, cottons, vegetable fibres, hides, skins, dye-stuffs, tanning materials, drugs, herbs, minerals, coffees, spices, teas, rubber, etc.*

* *Philadelphia Inquirer*, Monday, March 2, 1896.

Another section of the Empire Building is given over to the American forestry exhibit, particular attention being given to the Southern states, which are just now being looked to in a commercial sense as they have never been before. A large part of this display was secured at the Atlanta Exposition, and includes the collection of sugar cane from Louisiana, and the interesting turpentine exhibit, showing realistically the method of collecting this valuable product of the turpentine forests.

The exhibits are tastefully and conveniently arranged according to countries, beginning with Mexico and following with the Central and South American countries, in their order. After these come the countries of Europe, Asia and Africa.

Especial prominence is given to Mexico and the Spanish-American countries because of their growing importance to the mercantile and manufacturing interests of this country. This prominence, however, is not at the expense of the exhibits from other countries, for the collections from all of them will be extensively and conveniently displayed. The exhibit from Mexico can be taken as an illustration of the completeness of the different collections. It occupies no less than nine large rooms, and embraces every possible article of commercial value that country produces. In the exhibit are collections of woods from no less than fifteen different states in the Mexican Republic, which have already been or will be in the near future brought into use by the manufacturers of this country.

Another department, which illustrates the great scope of the museum and the thoroughness contemplated in its general plan, is the testing department. Here, with suitable

machinery and under the supervision of experts, will be made tests, for instance, of samples of foreign woods for the purpose of ascertaining their availability for certain uses. The scientific laboratories of botany and zoölogy and those of technology in connection with the museums are doing excellent work in the study of economic samples.

A department, fully as invaluable to the American manufacturer as any of the others, is that in which are displayed samples of foreign manufacturers. This display consists of a complete collection of manufactured articles which certain countries, notably those of Spanish America, Australia, South Africa, etc., do not produce themselves and which they must necessarily purchase elsewhere. An inspection of this department will show an American manufacturer just what these countries buy and where they buy.

A Bureau of Information is maintained whose object is to make a special study of foreign commerce, compile all data relative thereto, and make it available to the manufacturer or consumer in as concise and definite a form as possible. The bureau is located on the third floor, and a force of men and women is actively engaged in compiling the data, arranging indexes and getting things in shape.*

A library† is maintained in connection with the Bureau of Information, where business directories, trade and commercial publications, books of reference, etc., from all parts of the world are kept constantly on file. The library is receiving between 400 and 500 of the best trade publications from England, France, Germany and the United States, over fifty of them coming from London alone.

* See *Ledger*, February 19, 1896.
† *Philadelphia Inquirer*, March 2, 1896.

In addition to these are the official organs of Great Britain, France, Germany, Russia, Italy, Australia, Japan, Mexico and the South American countries.

There is also kept a complete file of statistical documents issued by different countries in relation to trade and commerce. The information and data contained in all of these publications is compiled and indexed for ready reference under the most approved library methods, so that the merchant or manufacturer may easily and quickly find that which refers to the particular line of industry in which he is interested.

The authorities expect, in the near future, to move the collections to West Philadelphia, near the University of Pennsylvania. On June 27, 1895, City Councils passed an ordinance giving over to the Trustees eight acres of land along the Schuylkill. By an ordinance approved October 10, 1896, eight acres more were added to this, making sixteen acres. Recently $200,000 has been appropriated out of the "loan bill" to commence work on the buildings; $50,000 was granted by the State of Pennsylvania; $100,000 has been raised by private subscription; and in December, 1898, the Congress of the United States passed a bill, which was signed by the President, authorizing the expenditure of $350,000 in the erection of exhibition and museum buildings for the Philadelphia Commercial Museums, so that the museums have become a national as well as a state and municipal enterprise.*

A casual reader will see, after perusing this sketch of

* Since writing the above, exposition buildings have been started and are well under way. An Exposition and Commercial Congress, it is planned, will be held in Philadelphia, beginning with the middle of September, 1899. It is planned that two of the exposition buildings, under course of erection, will become a permanent part of the Commercial Museums.

the facilities which are presented at Philadelphia, that the city is peculiarly fitted to be the botanical centre of America. Situated between New York, the metropolis of America, and the Capitol of the United States, it is within easy reach of the metropolitan life and publishing houses of the former city, and the libraries and scientific departments of the latter city, in the Smithsonian Institute and National Museum, and in the National Congressional Library. The libraries of the Pennsylvania Horticultural Society, the American Philosophical Society, the Pennsylvania Historical Society, the University of Pennsylvania, the Franklin Institute, the Free Library Company, and the Philadelphia Library Company present unusual opportunities for research and study. In addition to the facilities for study and research already mentioned, the city has Fairmount and Bartram's Parks, and the seed houses of national reputation of Landreth, Dreer, Buist, Blanc and Burpee, whose experiment farms lie within close proximity to the urban limits. Philadelphia has never very severe winters, being protected by the range of hills to the west and north-west. Lying in close proximity to New Jersey, whose peculiar flora is rich in species, and to the drainage areas of the Susquehanna, Delaware and Schuylkill Rivers, it is favorably situated for botanical research. Why not make Philadelphia the Botanical Centre of America?

Biographies of Botanists.

JAMES LOGAN.

James Logan,* one of the fathers of Pennsylvania, and greatly distinguished for his learning and worth, was born at Lurgan, County Armagh, Ireland, October 20, 1674. He came to America in company with William Penn, in 1699. In 1701 he was appointed Secretary of the Province of Pennsylvania, and Clerk of the Council. He was Chief Justice of the Supreme Court of Pennsylvania from 1731-39, and, as President of the Council, was for two years acting Governor of the Colony, after the death of Governor Gordon in 1736. Several years previous to his death he retired from public affairs, and spent the latter part of his life among his books, and in corresponding with learned men in different parts of Europe. He died near Germantown, October 31, 1751, bequeathing his library of 2000 volumes to the City of Philadelphia, which now forms part of the Philadelphia Library under the name, Loganian Library. In 1735 he published his experiments upon maize in support of Linnæan doctrine of sex in plants. The results of the experiments were given in brief in the letter to Peter Collinson, published in the *Philosophical Transactions* (34: 192-195), and later a full account was published in Latin, in a work entitled, "Experimenta et Meletemata de Plantarum Generatione, etc., auctore Jacobo Logan, *Judice Supremo and Præside Concilii Provinciæ Pensilvaniensis in America*, Lugduni Batavorum, Apud Cornelium Haak,

* 1849. Darlington—*Memorials of Bartram and Marshall*, p. 307.

1739," pp. 3-13 (preface dated Philadelphia, 1737).* In 1744 he published also a translation of Cicero's treatise, "De Senectute," at Philadelphia.

The country home of James Logan was at Stenton, Germantown, adorned with many fine trees and rare shrubs and plants.† Here was spent the quiet days of an extremely eventful and busy life.

CHRISTOPHER WITT.

Dr. Christopher Witt,‡ or DeWitt, as he is occasionally named, was born in Wiltshire, England, in the year 1675, he emigrated to America in the year 1704, and joined the theosophical colonists on the Wissahickon. He was then in his twenty-ninth year, and in addition to being a thorough naturalist and a skilled physician, was well versed in the mystic sciences and in astronomy. He was esteemed highly by his fellow-mystics, his services as a physician were constantly called into requisition. Shortly after the death of Kelpius, Doctor Witt, together with Daniel Geissler, removed to a small house in Germantown, upon the land owned by Christian Warmer, who, with his family, looked after the welfare of their tenants. In 1718 Dr. Witt purchased ground aggregating in all 125 acres. After the death of Geissler, Dr. Witt moved, according to tradition, to the large mansion house still standing at the south-east corner of Main and High Streets.

* See an article of mine, "James Logan," *Botanical Gazette*, August, 1894, p. 307. There are two oil paintings of Logan extant, one at the Pennsylvania Historical Society and one in Independence Hall.

† 1877. SCHARFF AND WESTCOTT—*The Historic Mansions and Buildings of Philadelphia*, p. 155. There is an oil painting of Stenton at the Pennsylvania Historical Society, and a pen and ink sketch by Mumford at the Philadelphia Library.

‡ 1895. SACHSE—*The German Pietists of Provincial Pennsylvania*, p. 402.

Dr. Witt was a good botanist, and upon removing to Germantown, he started a large garden for his own profit and amusement. It is probably the first botanical garden in America, antedating Bartram's celebrated garden by twenty years. There seems to have been a much earlier garden located on the lower Wissahickon, at the Monastery. In George Webb's poem, *Bachelor's Hall*, published in 1729, he speaks of a place of retreat situated near Philadelphia, * which was called "Bachelor's Hall, and was the headquarters of a social company. In addition to its uses for such purposes there was attached to the building a botanic garden, cultivated for the production of plants useful in medicine. Speaking of this building the poet says:

"Close to the dome a garden shall be join'd—
A fit employment for a studious mind.
In our vast woods whatever simples grow,
Whose virtues none but the Indians know,
Within the confines of this garden brought,
To rise with added lustre shall be taught;
Then culled with judgment each shall yield its juice,
Saliferous balsam to the sick man's use;
A longer date of life mankind shall boast,
And death shall mourn her ancient empire lost."

It is known that the members of this social fraternity interested themselves sufficiently in science to append such a garden to their place of good-fellowship, for medical purposes. It is not known who superintended the garden, which must have been under the charge of a person of more than ordinary taste. Dr. Witt corresponded for

* See introduction, p. 5. This poem varies in different books. The dome, referred to in the poem, is probably the observatory erected by the Rosicrucian fraternity near their garden founded in 1694. 1895. SACHSE—*The German Pietists of Provincial Pennsylvania*, p. 71.

many years with Peter Collinson, of London, whose letters to some of the leading men in the Province mention the high esteem and regard in which Dr. Witt was held by the English naturalist. In later years, there was a friendly intercourse between Dr. Witt and John Bartram. The following letter from the latter to Peter Collinson gives an interesting picture of the private life of the learned theosophist:

"June 11th, 1743.

"Friend Peter:

"I have lately been to visit our friend Doctor Witt, where I spent four or five hours very agreeably—sometimes in his garden, where I viewed every kind of plant, I believe, that grew therein, which afforded me a convenient opportunity of asking him whether he ever observed any kind of wild roses, in this country, that was double. He said he could not remember that he ever did. So being satisfied with this amusement, we went into his study, which was furnished with books containing different kinds of learning, as philosophy, natural magic, divinity, nay, even mystic divinity; all of which were the subjects of our discourse within doors, which alternately gave way to botany, every time we walked in the garden. I could have wished thee the enjoyment of so much diversion, as to have heard our discourse, provided thee had been well swathed from hips to arm-pits. But it happened a little of our spiritual discourse was interrupted by a material object within doors; for the Doctor had lately purchased of a great traveler in Spain and Italy, a sample of what was imposed upon him for snake stones, which took me up a little time, beside laughing at him, to convince the Doctor that they were nothing but calcined old horse bones.

"Indeed, to give the Doctor his due, he is very pleasant, facetious and plaint, and will exchange as many freedoms as most men of his years, with those he respects. His understanding and judgment thee art not unacquainted with, having had so long and frequent intercourse with him by letters.

"When we are upon the topic of astrology, magic, and mystic divinity, I am apt to be a little troublesome, by inquiring into the foundation and reasonableness of these notions, which, thee knows, will not bear to be searched and examined into; though I handle these fancies with more tenderness with him than I should with many others that are so superstitiously inclined, because I respect the man. He hath a considerable share of good in him.

"The Doctor's famous Lychnis, which thee has dignified so highly, is, I think, unworthy of that character. Our swamps and low grounds are full of them. I had so contemptible an opinion of it as not to think it worth sending, nor afford it room in my garden; but I suppose, by thy account, your climate agreeth so well, that it is much improved. The other, which I brought from Virginia, grows with me about five feet high, bearing spikes of different colored flowers, for three or four months in the year, exceeding beautiful. I have another wild one, finely speckled, and striped with red upon a white ground, and a red eye in the middle, the only one I ever saw.

"Our worthy friend Colden wrote to me he had received a new edition of Linnæus's Characteres Plantarum, lately printed. He advised me to desire Gronovius to send it to me. The first I saw was at the Doctor's, and chiefly by it he hath attained the greatest knowledge in botany of any I have discoursed with. JOHN BARTRAM."

Dr. Witt, besides being an excellent botanist, was an ingenious mechanic, constructing the first clocks made in Pennsylvania, if not in America. He was an artist and musician. He possessed a large pipe organ, said to have been made by his own hands. The scholarly Doctor also practiced horoscopy and would cast nativities, using the hazel rod in his divination.

When the Doctor was eighty years old his eyesight failed him, resulting finally in blindness. His slave, Robert, carefully looked after his wants until his death in the latter part of January, 1765, aged ninety years. Thus died Doctor Christopher Witt, the last of the Rosicrucian Mystics of Germantown.

He was buried in the Warmer burial-ground, in Germantown. This spot became known as Spook Hill.* Tales were told which have survived to the present time, how, upon the night following the burial of the old mystic, spectral flames were seen dancing around his grave.

JOHN BARTRAM.

John Bartram, founder of the celebrated Botanical Garden, was born near the village of Darby, in Delaware (then Chester) County, Pennsylvania, on the 23rd day of March, 1699.

His great grandfather, Richard Bartram, lived and died in Derbyshire, England. Richard had one son, named John, who married in Derby (England), and, with his wife, was settled for some years in the town of Ashborn, where they had three sons and one daughter.

* It is located on the high ground within the square bounded by High and Haines Streets, and Morton and Hancock Streets, and is reached either by the old lane leading from Haines Street into Mechanic Street, now Colwell Street, or by the path between St. Michael's Church and the parsonage.

With this family, John (following the fortunes of William Penn) removed to Pennsylvania in 1682—the year in which the city of Philadelphia was founded—and settled in what is now Delaware County, near Darby. He died on the first of September, 1697.

The names of the three sons who accompanied him to the western world, were John, Isaac and William. John and Isaac died unmarried, the former on the 14th of June, 1692, and the latter on the 10th of January, 1708. William Bartram, the third son, was married to Elizabeth, daughter of James Hunt, at Darby Meeting, on the 27th of March, 1696. The time of his death has not been ascertained. He had three sons, and a daughter who died young. The names of the sons were John (the Botanist), James and William. Of these, William went to North Carolina, and settled near Cape Fear; James, who remained in Pennsylvania, left no male descendants.*

John Bartram, eldest son of William and Elizabeth Bartram, and the subject of this memoir, inherited a farm near Darby, which was left to him by his Uncle Isaac.

One day in spring, about the year 1725, John Bartram, after ploughing awhile in one of his fields, paused under the shade of a tree to rest. While sitting upon the grass near his panting beasts, he cast his eyes upon a daisy, which he plucked mechanically, and began to look at it with a certain languid curiosity. The more he looked, the more interested he became; observing the various parts, some perpendicular, some horizontal, some white, some yellow; and he fell to wondering what could be the purposes

* The Bartram Tribute. Bartram Garden, Kingsessing, June 13 and 14, 1860, published as an auxiliary aid to the purposes of the Festival given by the ladies of St. James' Episcopal Church, Kingsessing. 1849. DARLINGTON—*Memorials of John Bartram and Humphry Marshall.*

and functions of the several parts of the flower. For the first time he was struck with his ignorance of the common things about him.

"What a shame it is," said he to himself, "that I should have employed so many years in tilling the earth, and destroying so many flowers and plants without being acquainted with their structure and their uses!"

In relating the events of this day, he would declare his inability to account for such thoughts. He said it was like an inspiration, for he had never had such reflections before in his life. After pulling his daisy to pieces, and musing on the parts awhile, he took hold of his plough again, and resumed his labor.

But his new thoughts did not abandon him, and a strong desire arose within him for some knowledge of the plants and flowers around him. When the bell summoned him to dinner, he related these circumstances to his wife, and made her acquainted with the desire for knowledge which had sprung up in his mind. She did not encourage him. He was not rich enough, she said, to spend any of his time in such pursuits, and she advised him to stick to his farm, which, being recently hewed out of the wilderness, demanded all his time and care.

But he could not overcome his new desire. It haunted him continually, whether he was at work or at rest, at table or in bed. He resisted the impulse for four or five days, and then, finding his desires unconquerable, he hired a man to plough for him, saddled his horse and rode to Philadelphia. Arriving at the city, then a town of ten thousand inhabitants, he went to a book store. Not knowing what book to ask for, he told the bookseller his story, and said he

wanted a book which would give him the botanical knowledge of which he was in search. The bookseller provided him with a work upon botany written in Latin, and a Latin grammar as well. This was sorry comfort to a mind so eager, but he was fain to put the books in his saddle-bag, and return to his farm with them. There was a schoolmaster in the neighborhood who taught Latin, and under him this enthusiastic student made such progress, that in three months he found himself able to translate, slowly and with difficulty, the Latin of his botanical work.

The following story as told by his son William, of how Bartram became a botanist, is probably more authentic than the above story which has been so often quoted.*

"Being born in a newly-settled colony, of not more than fifty years establishment, in a country where the sciences of the old continent were little known, it cannot be supposed that he could derive great advantages or assistance from school-learning or literature. He had, however, all or most of the education that could, at that time, be acquired in country schools; and whenever an opportunity offered he studied such of the Latin and Greek grammars and classics as his circumstances enabled him to purchase; and he always sought the society of the most learned and virtuous men.

"He had a very early inclination to the study of physic and surgery. He even acquired so much knowledge in the practice of the latter science as to be very useful; and, in many instances, he gave great relief to his poor neighbors, who were unable to apply for medicines and assistance to the physicians of the city (Philadelphia). It is extremely

* See *Meehan's Monthly*, ix, 96 (1899).

probable that, as most of his medicines were derived from the vegetable kingdom, this circumstance might point out to him the necessity of and excite a desire for the study of botany."*

James Logan was probably the first to direct the mind of John Bartram seriously to botany, as the study of a lifetime. In 1729 he wrote to England for a copy of Parkinson's Herbal, which he wanted to present to John Bartram, who, he said, was a person worthier of a heavier purse than fortune had yet allowed him, and had a genius perfectly well turned for botany.†

Then he began to botanize all over the farm. In a short time he became acquainted with every plant, shrub, tree and flower in his neighborhood. Then, as opportunity favored, and the work of his farm allowed, he made botanical tours in Maryland, Pennsylvania and Delaware, being entertained by the members of the religious body to which he belonged, the Society of Friends. Ere long, his circumstances improving, he extended his journeys into Virginia, the Carolinas and New York; until, in fact, he was acquainted with the nature and habits of every plant that grew between the Alleghany range and the Atlantic Ocean, and had recorded his observations with scientific exactness.

He owed the leisure which enabled him to pursue these extensive studies to his excellent treatment of his servants, and his superior management of his farm. At a time when almost every other farmer of any wealth cultivated his land with negro slaves, John Bartram set his

* The portion of the sketch designated by quotation marks is taken from an account of John Bartram written by his son William, and published in Professor Barton's *Medical and Physical Journal*. See Bartram's preface to SHORT's *Medicina Britannica*. (1751).

† 1884. SCHARF AND WESTCOTT—*History of Philadelphia*, I, 234.

negroes free, paid them eighteen pounds a year wages, taught them to read and write, sat with them at table, and took them with him to Quaker meetings.*

He was the second Anglo-American who conceived the idea of establishing a botanic garden, for the reception and cultivation of the various vegetables, natives of the country, as well as of exotics, and of traveling for the discovery and acquisition of them. "He purchased a convenient piece of ground at sheriff's sale on the margin of the Schuylkill, at a distance of three miles from the city, † a happy situation, possessing every soil and exposure adapted to the various nature of vegetables. Here he built with his own hands a comfortable house of hewn stone, and laid out a garden, containing about five acres of ground.

"He began his travels at his own expense. His various excursions rewarded his labors with the possession of a great variety of new, beautiful and useful trees, shrubs and herbaceous plants.

"A member of Franklin's celebrated club, called the "Junto," Joseph Breintnall, an enterprising young merchant of Philadelphia, much interested in science, was the means of conveying to Europe the knowledge which John Bartram had collected. One of the noted botanists then living in England was a Quaker gentleman, named Peter Collinson, a rich woolen draper, a great friend all his life of Pennsylvania and Pennsylvanians—a correspondent of Franklin for fifty years. To this excellent man Joseph

---

* James Parton—*Wood's Household Magazine*, Oct., 1871, p. 167.

† The Deed—Owen Owen, Sheriff, to John Bartram bears date September 30, 1728. The garden was probably commenced soon afterwards. The year in which the dwelling house was erected may be gathered from an inscription on a stone in the wall, John * Ann: Bartram: 1731.

Breintnall conveyed John Bartram's botanical diaries, which Collinson read with extreme interest, and he opened a correspondence with the American botanist that terminated only with his life.

"He carried on a botanical correspondence with Queen Ulrica, of Sweden, sister of Frederick the Great. Indeed, we may say that through John Bartram the vegetable wealth of North America was communicated to Europe. And not the vegetable wealth only, for he sent to his friend, Collinson, American turtles, birds, animals, minerals, as well as minute accounts of such things as could not be transported. And all was done in the most delightfully simple, inexpensive, unpretending manner. Peter Collinson occasionally sent the American botanist a pocket compass or a new suit of clothes, which Bartram received with gratitude, and repaid by a box of live turtles, or a case of stuffed birds. Probably the immense and incalculable service which John Bartram rendered Europe did not cost Europe a thousand pounds sterling.

"Peter Collinson and John Bartram, both Quakers and both botanists, not only exchanged long letters by every ship upon their favorite science, but seeds, roots, cuttings, plants and trees. Almost every ship that left the Delaware conveyed something of this nature—boxes of roots, or packets of seeds—consigned to Peter Collinson in London, which on arriving were tried in Collinson's own garden, and distributed among noblemen and gentlemen interested in botany, or in the decoration of parks and grounds. To encourage Bartram to make more extensive tours, and to compensate him for labors from which they derived so much advantage, Collinson, the Duke of Richmond and Lord Petre

subscribed ten guineas each per annum, the value to be returned to them in American seeds and roots. Some years later, Bartram was appointed botanist to the king, at a salary of fifty pounds a year—one of the wisest expenditures a king ever made, for it introduced into English parks and gardens every vegetable production of North America which could be of value. In 1735 we find Collinson sending, in addition to various fruit and shade trees, many flowers which seem to have been new to America, to Bartram with others, like lilacs and double narcissus, which Bartram complains are already too numerous, as the roots brought by the early settlers had spread enormously.

"Among the new flowers for America we find tulips, double sweet-briar roses, twenty sorts of crocus, lilies, narcissus, gladiolus, iris and snap-dragon, also the perennial oriental poppy, cyclamens and carnations, while in return Bartram sends Collinson bush honey-suckles, fiery lilies, mountain-laurel, dog-tooth violets, wild asters, gentians, ginseng and sweet fern, with magnolia, tulip and locust trees, the hornbeam, witchhazel, cones of the spruce and hemlock, red and white cedar, and seeds of the sugar maple, about which the Englishmen were very curious.* Nor did he confine his services to Great Britain. He sent American plants and seeds to Linnæus and to botanists all over Europe.†

With the stimulus given to him through correspondence and exchange with European botanists and horticulturists he employed much of his time in traveling through the different provinces of North America, at that

* *The Asa Gray Bulletin*, III, April, 1895, p. 15.

† PARTON—*Wood's Household Magazine*, October, 1871, p. 169.

time subject to England. Neither dangers nor difficulties impeded or confined his researches after objects in natural history. The summits of our highest mountains were ascended and explored by him. The lakes, Ontario, Iroquois and George; the shores and sources of the rivers Hudson, Delaware, Schuylkill, Susquehanna, Alleghany and San Juan were visited by him at an early period, when it was truly a perilous undertaking to travel in the territories, or even on the frontier. The results of this extended journey are recorded in 'Observations on the Inhabitants, Climate, Soil, Rivers, Productions (Animals and other matters worthy of notice) made by Mr. John Bartram in his travels from Pennsylvania to Onondago, Oswego and the Lake Ontario.' Printed by J. Whiston and B. White, Fleet Street, 1751.

"He traveled several thousand miles in Carolina and Florida. At the advanced age of near seventy years, embarking on board of a vessel at Philadelphia, he set sail for Charleston, in South Carolina. From thence he proceeded by land through part of Carolina and Georgia to St. Agustine, in East Florida. When arrived at the last-mentioned place—being then appointed botanist and naturalist for the King of England, for exploring the provinces—he received his orders to search for the sources of the great river St. John's.

"Leaving St. Augustine, he traveled by land to the banks of the river, and embarking in a boat at Picolata, ascended that great and beautiful river (400 miles) to its sources, attending carefully to its various branches and the lakes connected with it. Having ascended on one side of

the river, he descended by the other side to its confluence with the sea.*

"In the course of this voyage or journey, he made an accurate draft and survey of the various widths, depths, courses and distances, both of the main stream and of the lakes and branches. He also noted the situation and quality of the soil, the vegetable and animal productions, together with other interesting observations, all of which were highly approved of by the governor and sent to the Board of Trade and plantations in England, by whose direction they were ordered to be published for the benefit of the new colony.

"Out of his great but unfulfilled desire to explore the Mississippi Valley grew that idea of exploring the Missouri country, discussed immediately after the Revolutionary War, by Franklin, William Bartram and the Marshalls. This discussion and hope became almost a reality ten years afterward, when Dr. Wistar wrote to one of the Marshalls that 'Mr. Jefferson and others are much interested — * * * and think they can insure a thousand guineas to any one who undertakes the journey, and can bring satisfactory proof of having passed across to the South Sea. If thee can come to town and converse with Mr. Jefferson, I am confident no small matter will stop them.'

"Something happened, for ten years later, when the expedition started in 1803 that was to give us the Oregon country as proof of having reached the South Sea, we know it was led by Lewis and Clarke, but Jefferson's instructions to them read like extracts from Bartram's letters.

"Mr. Bartram was a man of modest and gentle manners, frank, cheerful, and of great good-nature; a lover

* 1849. DARLINGTON—*Memorials of John Bartram and Humphry Marshall.*

of justice, truth, and charity. He was, himself, an example of filial, conjugal, and parental affection. His humanity, gentleness, and compassion were manifested upon all occasions, and were even extended to the animal creation. He was never known to have been at enmity with any man. During the whole course of his life there was not a single instance of his engaging in a litigious contest with any of his neighbors or others. He zealously testified against slavery; and that his philanthropic precepts on this subject might have their due weight and force, he gave liberty to a most valuable male slave, then in the prime of his life, who had been bred up in the family almost from infancy.

"He was through life a striking example of temperance, especially in the use of vinous and spirituous liquors; not from a passion of parsimony, but from a principle of morality. His common drink was pure water, small beer, or cider mixed with milk. Nevertheless, he always kept a good and plentiful table. Once a year—commonly on New Year's Day—he made a liberal entertainment for his relations and particular friends.

"A foreign gentleman, who visited him in his old age, says, 'that when the bell announced that dinner was ready, the whole family and all the servants went into the dining-room together. At the head of the table, the father and mother took their seat. The family and the guests sat next to them; then, the white hired men, and last of all, the negroes; and they all dined together in harmony. One of his negroes was his steward and man of business, who went to market, sold the produce, and transacted all the business of the farm and family in Philadelphia.'*

* *Wood's Household Magazine*, October, 1871.

BARTRAM'S HOUSE (WEST FRONT).

UNIVERSITY OF ARIZONA
LIBRARY

"His stature was rather above the middle size, and upright. His visage was long, and his countenance expressive of a degree of dignity, with a happy mixture of animation and sensibility.

"He was naturally industrious and active, both in body and mind, observing that he never could find more time than he could employ to satisfaction and advantage, either in improving conversation, or in some healthy and useful bodily exercise; and he was astonished to hear men complaining that they were weary of their time, and knew not what they should do.

"He was born and educated in the sect called Quakers. But his religious creed may, perhaps, be best collected from a pious distich, engraven by his own hand, in very conspicuous characters upon a stone placed over the front window of the apartment which was destined for study and philosophical retirement.

"IT IS GOD ALONE ALMYTY LORD
THE HOLY ONE BY ME ADOR'D
IOHN BARTRAM 1770."

"A man of great liberality in his religious opinions, he used to say that man's whole duty was comprised in the three-fold injunction: 'Do justice, love mercy, and walk humbly before God.'

"He never coveted old age, and often observed to his children and friends that he sincerely desired that he might not live longer than he could afford assistance to himself; for he was unwilling to be a burden to his friends, or useless in society; and that when death came to perform his office, there might not be much delay.

"To his seventy-ninth year he was a happy, cheerful, active, useful man, and he died after a short illness, surrounded by his large family of respectable and virtuous children. He would probably have lived longer but for his great dread that the British army, after the battle of Brandywine, would overrun his darling garden, which had been his pride and delight for fifty years. They spared it, however, but the shock of apprehension hastened the departure of the illustrious gardener."

It appears by the records of the American Philosophical Society, of which John Bartram was one of the original members, that he died on the 22nd of September, 1777, aged seventy-eight years and six months.

John Bartram was married twice. His first wife was Mary, daughter of Richard Maris, of Chester Monthly Meeting. They were married in January, 1723, and had two sons, Richard and Isaac; the former of whom died young. Isaac died in 1801, aged about seventy-six years. Mary Bartram died in 1727. His second wife was Ann Mendenhall, of Concord Monthly Meeting (then Chester) Delaware County. They were married in September, 1729, and had nine children. Ann Bartram survived her husband upward of six years, dying on the 29th of January, 1784, at the age of 87.

Bartram was not satisfied with being merely a farmer. He desired to understand the philosophy of his calling. So in September, 1728, he bought at sheriff's sale * a piece of ground on the west side of the Schuylkill river, below the Lower Ferry, on the road to Darby, which had belonged to Frederick Schobbenhausen. Here was commenced in 1730,

* Owen Owen, High Sheriff to John Bartram, September 30, 1728.

BARTRAM'S HOUSE (SOUTH SIDE).

UNIVERSITY OF ARIZONA
LIBRARY

and finished in 1731, a house of hewn stone, of quaint, old-fashioned style of architecture, which, solid and enduring in its material, has stood against the dilapidating fingers of time for over a century and a half. It has been said that Bartram built this house with his own hands. Upon a stone built in the south wall, above the second story, is this inscription:*

⁂⁂⁂ ΘεΟΣ ⁂⁂⁂⁂⁂ ΣΩΖΩ ⁂⁂⁂⁂
IOHN ✦ ANN : BARTRAM : 1731.

The wood-work over the porch and stone and brick addition on the south were added in this century. The western doorway was the original entrance, and through it one steps down into the house. The rooms are, with one exception, small, and are floored with the original heavy oak boards. In one of the rooms a cupboard in the wall beside the chimney is shown as the place where Bartram kept his seeds. This is doubtful, when the great quantity he kept on hand is considered, and, in spite of the thickness of the wall, this cupboard must have been a rather warm place.

Iwan Alexiowitz quoted by St. John,† speaking of Bartram's house and garden, says: "His house is small, but decent; there was something peculiar in its first appearance, which seemed to distinguish it from those of his neighbors; a small tower‡ in the middle of it not only helped to strengthen it, but afforded convenient room for a staircase. Every disposition of the fields,

* The inscription in Greek reads translated "[I] God save," possibly intended for imperative ΘΕΟΣ [ΣΕ] ΣΩΖΕ God [thee] save. Bartram used the character ε for E.

† 1895. WESTCOTT—*The Historic Mansions and Buildings of Philadelphia*, 183.

‡ See frontispiece of DARLINGTON—*Memorials of Bartram and Marshall*, pp. 44-46.

fences and trees, seemed to bear the marks of perfect order and regularity, which in rural affairs always indicates a prosperous industry." * * * "We entered into a large hall, where there was a long table full of victuals, at the lowest part sat his negroes, his hired men were next, then the family and myself, and at the head the venerable father and wife presided. Each reclined his head and said his prayers, divested of the tedious cant of some and of the ostentatious style of others. After dinner we quaffed an honest bottle of Madeira wine, * * * and then retired into his study. I was no sooner entered than I observed a coat-of-arms in a gilt frame, with the name JOHN BARTRAM. The novelty of such a decoration in such a place struck me. I could not avoid asking: 'Does the Society of Friends take any pride in these armorial bearings, which sometimes serve as marks of distinction between families, and much oftener as food for pride and ostentation.' 'Thee must know' (said he) 'that my father was a Frenchman*; he brought the piece of painting over with him."

Nearly forty years afterward, over the front window of his study was engraved this inscription:

"IT IS GOD ALONE ALMYTY LORD
THE HOLY ONE BY ME ADOR'D
IOHN BARTRAM 1770."

Entering the house in which Robert J. Rule, with his family, now (1899) resides, the old dwelling is found to

* This is an error. The reference is to a Norman Frenchman that came with William the Conqueror into England. The original spelling of the name was Bertram. The description of the coat of arms (see frontispiece) is as follows: Gu. on an escutcheon or, betw. eight crosses pattée ar. an anvil ppr. Crest—Issuing out of an antique crown or, a ram's head ppr. Motto—J'avance.

CARVED STONE WORK, BARTRAM'S HOUSE
(EAST FRONT).

UNIVERSITY OF ARIZONA
LIBRARY

abound in querks and turns, cunning cupboards and curiously carved closets and mantels, set in the thick walls. There are seven rooms on the first floor, six on the second, and six attic rooms, and over them again is a long loft, but it seems likely from their appearance that one or more of these rooms were made at a recent period. In the apartments to the right, as you enter, a quaint den with curious fastenings is noticeable, which leads out to the sunny front porch. This doorway was somewhat altered by Mr. Eastwick, who erected on the interior a second door, thus making a small closet, the wall being over half a foot thick; this second door should, undoubtedly, be pulled down, and the front entrance to the house facing the river again be used. In the kitchen, Mr. Eastwick's alterations are again noticeable, as the old fire-place, about five and a half feet high and well nigh six feet long, has been boarded up by a wooden wainscoating of modern appearance, which runs all around the room and detracts from the old-fashioned character of the apartment. The old fire-place, however, is still intact, and could be, with little trouble, restored to its former appearance.

All the walls of the house have, unfortunately, been papered. In the sitting-room, also, the fire-place has been boarded up, and the old Franklin stove, a present from "Friend Benjamin," has been removed. In this room can still be seen Ann Bartram's china closet, a very pretty piece of old-fashioned wood-work. It is built in the wall over the mantel-piece. To the left, on one side of it, is a curious old cubby-hole, a deep closet running from the floor to the ceiling, with a recess behind in the solid wall, running back of the chimney, where Bartram secreted his money and

valuables. Passing down a short flight of steps from the sitting-room, we stand upon the floor of an airy apartment, looking towards the south, with three large windows, two looking into the garden, and one facing the river. From this room there is a doorway leading out into the garden. This apartment, it is said, was once the conservatory where rare plants and gaudy lilies bloomed.

We next enter the room which John Bartram occupied. It is, perhaps, the smallest apartment in the house, with one door leading to the sitting-room and another opening on the front porch. It has a large window facing the river, and a small window, which has been pasted over with wall paper looking into the conservatory. It was in Bartram's room, in later years it is said, that Alexander Wilson, the noted ornithologist, wrote the first pages of his great work on our American birds, under the patronage and aided by the suggestions of William Bartram, the son and successor of John Bartram.

The old staircase which leads to the second floor is still in existence, but Mr. Eastwick removed the original balustrade and substituted a modern one. However, he left on the first landing a fragment of the original balustrade made by Bartram, which would be a sufficient guide to duplicate the whole. The rooms on the upper floor are, no doubt, exactly as they were in Bartram's day, with the exception that the old-fashioned fire-place has been boarded up and the walls papered, and that the porch has been converted into a sleeping room. In one room the visitor is particularly impressed with the incongruous appearance of a modern iron register built into one of the walls to furnish the room with heat from a stove below. There are some of the

BARTRAM'S HOUSE (EAST FRONT).

UNIVERSITY OF ARIZONA
LIBRARY

quaintest and most interesting bits of old-fashioned wood-work imaginable over the mantels in these up-stairs rooms of Bartram's house.

The old wood-shed figured in *Meehan's Monthly*, January, 1896 (VI: 17), was for a long time Bartram's potting and packing shed, and doubtless many of the cherished plants of Collinson and other English worthies saw the light of America here for the last time. It was in this shed that the work published in 1853, describing all the trees then growing in Bartram's garden, was written. The writer of that work, Thos. Meehan, lived a mile from the garden, and to save his time the offer to fit up a room in this wood-shed was made and accepted, and "The Hand-book of Ornamental Trees" was completed under the shade of the trees of the garden.*

These buildings stand about midway in the grounds, where the higher portion ends and the slope to the Schuylkill begins, and are reached, as in Bartram's time, by a private lane that runs in from Darby Road, and which is bordered by forest trees, among them some beautiful willow and pin oaks.

The lane skirts the upper part of the orchard where Bartram experimented successfully with irrigation. Near a group of white pines a diverging path runs diagonally from the lane across the orchard, past a fine yew, and on to the west entrance to the house, where lane and path meet again at the doorway, after having passed through the oldest part of the garden. Near the house they cross a railroad cut (really a picturesque feature, its rocky walls curtained

* *The American Hand-book of Ornamental Trees*, by Thomas Meehan, gardener, Philadelphia. Lippincott, Grambo & Co., 1853, octavo pp., xv. 257.

with herbaceous plants and vines) that marks the site of the old kitchen garden; between this and the house was the flower garden, and portions of the beds are yet outlined by box borders that were planted about fifty years ago.

The path is, perhaps, rather more attractive than the lane. From its entrance into the grounds, across the bridge, past the barns and to the house-door it is like turning the pages of the earlier Collinson letters. First come the "narrow-leaved oaks" and "noble white pines;" close by the bridge is "that curious tree from the Jerseys" (Hackberry, *Celtis occidentalis*); near the west door a "sugar-tree" and horse-chestnut; the latter, perhaps, the one that Bartram believed to have been the first to blossom in America.

The garden which Bartram laid out adjoining his house by the exercise of his skill, industry and taste, became one of the most attractive places in the neighborhood of the city. The ground occupied six or seven acres, with a variety of soils and different exposure. The garden, according to St. John, contained a great variety of curious shrubs; some grew in a greenhouse, over the door of which were written these lines:

> "Slave to no sect, who takes no private road,
> But looks through Nature up to Nature's God."

From the house to the river the land falls gradually, but directly in front of the house is a terrace, with remains of a box-border along its outer edge, where it is upheld by a dry stone retaining-wall, pierced by two narrow flights of steps. From the terrace, paths originally led by circuitous routes through the grounds and down to the river; one of them ran near the greenhouse, whose lines are still visible,

BIG CYPRESS, BARTRAM'S GARDEN
(LOOKING TOWARD RIVER).

UNIVERSITY OF ARIZONA
LIBRARY

a short distance from a very beautiful yellow-wood, *Cladrastis lutea.* Further down, this path runs near the great cypress, *Taxodium distichum* brought to the garden by Bartram, and now seven feet in diameter. John Bartram * while on his journey through the Florida swamps lost his whip, and in looking for a switch saw a small sapling growing erect by the river-side. He stopped his horse, got down on the ground, and pulled it up by the roots. Instead of using it for a whip as was his intention, he put it in his saddle-bag and brought it home, planting it in the northern part of his garden, predicting at the time that it would grow to an immense height. His saying proved true, for to-day it is seven feet in diameter, and 150–175 feet high.

In the southern part of the grounds are the fine magnolias; one of them *M. acuminata,* was first made known by John Clayton in 1736. In the garden there stands a specimen undoubtedly the one which Bartram discovered on the Susquehanna during his trip with Conrad Weiser to the Five Nations in 1743. Bartram sent plants to Peter Collinson, in whose gardens and in those of Lord Petre it was first cultivated in Europe. Near by grows the "rose bay," as they first called the rhododendron, and a noble mossy-cup oak, one of the finest trees on the place. In other parts of the garden are found the following:

Magnolia Fraseri, discovered by William Bartram in May, 1776, on the head-waters of the Keowee. It was introduced probably from Bartram's garden ten years later.

Asimina triloba was first cultivated in 1736 by Peter Collinson, who probably received it from John Bartram.†

---

*Probably obtained in Delaware. I give the usual version of the story. The tree, alive in 1890, is now dead.

†SARGENT—*Silva of North America,* I, 24.

Gordonia pubescens. All of the specimens in cultivation are descendants of the plants collected by the Bartrams and Marshall. The specimen plants by John Bartram was described as thirty feet high by Wm. Wynne, writing to *Loudon's Gardeners' Magazine* (viii, 272), in Nov. 1831, when the tree was in flower.* The large tree in the garden was blown down a few years since. Wm. DeHart, who knew the Bartrams, has a descendant of the large tree in his garden (1899) on Woodland Avenue, Philadelphia, about thirty feet high. There are trees also nearly as large in Fairmount Park and Meehan's nurseries.

Cyrilla racemiflora, proved hardy, according to Nuttall, in the garden, where in 1840 he found a specimen twenty feet high and twenty-six inches in diameter.

Cliftonia ligustrina, according to Nuttall (Silva II, 94), was also hardy here.

Rhamnus Purshiana was discovered in 1805 or 1806 in what is now Montana, by the members of the trans-continental expedition under the command of Lewis and Clark.† In 1838 Rafinesque describes in the "Sylva Telluriana" his *Personon laurifolium,* from a plant which he found in Bartram's garden. This is the earliest record of the cultivation of the tree, for there does not seem to be much doubt that it was this plant which Rafinesque had in mind.

Æsculus Hippocastanum was brought for the first time in America from seed sent in April, 1746, to John Bartram.

Quercus Phellos ‡. A specimen of this peculiar tree

*A notice of this tree was published in Thomas Meehan's *The American Hand-book of Ornamental Trees,* p. 127. Discovered in 1765 near Fort Barrington, on the Altamaha River in Georgia, and named *Franklinia* in honor of Franklin.

†SARGENT—*Garden and Forest,* iv, 76.

‡SARGENT—*Silva of North America,* viii, 180.

BIG CYPRESS, BARTRAM'S GARDEN (1890).

UNIVERSITY OF ARIZONA
LIBRARY

growing in a field belonging to John Bartram was first described by the younger Michaux in 1842, although it appears to have been known much earlier, as "that particular species of oak that Dr. Mitchell found in thy meadow," seeds of which Peter Collinson asked from "my good friend John," in March, 1750, was probably of this tree. It was destroyed, but a seedling planted by Humphry Marshall in his arboretum at Marshallton, more than a century since, still survives.*

It is said that Washington and Franklin made frequent visits to the garden just prior to the Revolution, and used to sit under the shade of the old grape-arbor, which was located a few yards from the northern portion of the house. They would sit and talk, enjoying the delightful scene of the wooded banks and meadows along the Schuylkill. It has rightly been called the Washington Arbor. The stone that Washington used to step upon in alighting from his door-step to the sidewalk at the house in which he lived on Sixth Street, below Market, was also until recently kept under this arbor. At the southern end of the old mansion you see an old pear tree still vigorous, spreading its branches. This was called by John Bartram "The Petre Pear Tree," from the fact of its having been raised from a seedling sent over from England in 1760 by Lady Petre.†

*The following catalogue of plants prepared in 1807 will give some idea of the extent of the collections: "A Catalogue of Trees, Shrubs and Herbaceous Plants, indigenous to the United States of America, cultivated and disposed of by John Bartram & Son at their Botanical Garden, Kingsessing, near Philadelphia. To which is added a Catalogue of Foreign Plants collected from various parts of the Globe. Philadelphia. Printed by Bartram and Reynolds, No. 58 North Second Street, 1807."

†It is alive in 1899. In reply to a letter (1895) presenting some of the pears to Prof. L. H. Bailey, Cornell University, he writes me: "It is a famous old variety, scarcely known, however, out of Bartram's own garden in Philadelphia. I had never seen it before, and I am glad to add a photograph of it to my collection of curiosities." The tree is seen to the right in the illustration of the south side of Bartram's house.

On leaving the house from the southern doorway may be seen a narrow gravel walk, closed in on either side by a row of rare specimens of fir trees, pines, oaks, etc. Here is the celebrated Bartram oak, *Q. heterophylla.** There may be seen also two fine specimens of boxwood sent to John Bartram by the Earl of Bute, from Smyrna and Turkey, respectively.

The box-trees planted about the house are of such enormous size that they interfere with all views, and near the upper corner of the house is a thorn (Christ thorn) sent by Collinson, and near the south end is the pear tree, already referred to. Probably two of the most curious objects to be seen in the garden is the old cider press, situated on the banks of the river, drilled out of a solid piece of rock, and the grotto in the woods to one side of the house. The grave where Harvey, the slave, is buried lies to the south-east of the house, along the river front, the head-stone being almost entirely destroyed by relic hunters before the city bought the property.†

Dr. James Mease, writing in 1810, said that Bartram's garden contained about eight acres. "From the house there is a gentle descent to the river Schuylkill, from the banks of which a fine prospect opens of that river and of rich meadows up and down on both sides. The Delaware is also seen at a distance. The garden contains many of the tall southern forest trees, which have been successfully introduced by the father or his son William, and have been naturalized."

* *Quercus heterophylla* Michaux f. Hist. Am. 2: 87 pl. 16, the Bartram Oak, probably a hybrid of *Q Phellos* with *Q rubra*, but perhaps a distinct species, intermediate in leaf and fruit character between the two, occurs from Staten Island to North Carolina.

† Now carefully marked.

Ann M., daughter of John Bartram (a nephew of William), married Robert Carr, a printer, in March, 1809. Mr. Carr was an officer in the United States army, in the war of 1812, and conspicuous among the local militia. He was for some time Adjutant-General of the State, with the title of Colonel. After this marriage, the father of Colonel Carr's wife assisted William in the garden until his death in 1812. He was a very ingenious mechanic, and fond of using tools, but his greatest delight was in drawing and painting. He drew the greater number of plates in Professor Barton's *Elements of Botany*, published in 1803. William died suddenly June 22, 1823. He was never married. Colonel Carr, after his marriage, became a resident of the botanic garden, and devoted himself with great care and interest to the preservation of the collection.

The committee of the Pennsylvania Horticultural Society, which visited the garden in 1830, when it was still under the direction of Robert Carr, found the estate to be in most excellent order. They reported as follows: "The present owner is likewise adding annually and extensively,* and the committee consider his garden and grounds a rich deposit of the American flora. From this nursery many thousands of plants and seeds are exported every season. It is computed that there are 2000 species of our native productions, contained in a space of six acres. Plants of every size are to be seen here, from the minutest marchantia to the loftiest cypress. One of these is 112 feet high, 25 feet in circumference, and 91 years old. A young Norway spruce of 80 feet stands close by and also one of our native

* Compare the Seed Catalogue of 1807 with that of 1828, which is to be had at the Library of the Penna. Historical Society or the Philadelphia Library.

magnolias (*M. acuminata*), of the same height. Here, too, is the Kentucky Coffee Tree—the *Acacia Julibrissin*, so beautiful in flower, and graceful in form—the fly-catcher (*Dionæa muscipula*), etc.

"On the south of the garden is a field of three acres, preparing for a vineyard, as an addition to the one already planted. Mr. Carr has 145 sorts of grapes and has produced very good wine for some years past.

"The exotic department of this garden is also very rich, consisting of 900 varieties, besides a splendid collection of more than 800 camelias, containing 36 sorts. The green and hot-houses are 196 feet long, and much framing is in use. The largest sago palm that we have ever seen is here; the circumference of the foliage is 22 feet, and of the stem, 3 feet 4 inches. Some beautiful species of tropical production may be enumerated; such as the *Euphorbia heterophylla* with its large scarlet flowers, *Zamia*, *Pandanus*, *Maranta*, *Ficus* and a *Testudinaria elephantipes*, supposed to be 150 years old; some curious species of cactus lately received from Mexico—these last are astonishing productions, and new to us. A lemon tree from seed is worthy of notice on account of its easy propogation. Mr. Carr's fruit nursery has been greatly improved, and will be enlarged next Spring to twelve acres; its present size is eight. The trees are arranged in systematic order and the walks well graveled. Here are to be found 113 varieties of apples, 72 of pears, 22 of cherries, 17 of apricots, 45 of plums, 39 of peaches, 5 of nectarines, 3 of almonds, 6 of quinces, 5 of mulberries, 6 of raspberries, 6 of currants, 5 of filberts, 8 of walnuts, 6 of strawberries and 2 of medlars. Mr. Carr, who deserves so much credit for the classification of his nursery,

BARTRAM'S GARDEN IN 1890
(LOOKING FROM RIVER).

UNIVERSITY OF ARIZONA
LIBRARY

is no less entitled to praise for the admirable order in which his tool-house is kept. This applies likewise to the seed room, where the best method is preserved in putting up our native seeds. That apartment, moreover, contains a library of 400 volumes, in which are all the late works on botany and horticulture." *

Andrew M. Eastwick had a mortgage of $15,000 against the property, and Colonel Carr and his wife, being in declining years, and their son having died, they were anxious to retire from the nursery business, and offered to give the property to Eastwick for the mortgage. †

Eastwick had a fondness for the place, for he had made many a pleasure trip in his boyhood, by boat, to Carr's Gardens, and he therefore readily accepted Colonel Carr's offer. Eastwick was in early life a machinist, and became a locomotive builder, with a partner named Garrett. He afterwards associated with him Joseph Harrison, Jr., and one of the greatest achievements of the firm was the designing of an eight-wheeled freight locomotive, which was so successful that it soon became the accepted type for freight service. This locomotive attracted the attention of agents of the Emperor Nicholas of Russia, who contracted with Eastwick, Harrison, and Thomas Winans, of Baltimore, to build and equip a railroad from Moscow to St. Petersburg.

At the time this offer was made by Colonel Carr, Eastwick was home on a flying trip, expecting to return to Russia within a week. Desiring, first of all, to protect the

* The library of the Bartram family was presented to the Pennsylvania Historical Society by Wm. Middleton Bartram. One hundred books of John Bartram, William Bartram, and others of the family thus remain intact. For an account of this library, see Philadelphia *Public Ledger*, Friday, September 11, 1891.

† *Public Ledger*, Saturday, May 30, 1896, p. 2.

garden and its valuable collection of trees for all time, he applied to Robert Buist, who was then the leading nurseryman of Philadelphia, to engage for him, within one week, some one who should combine a botanical knowledge with practical horticulture and civil engineering. Buist promised to procure such a man, but found he could not do it within the limited time, and to keep faith with Eastwick, he offered his own foreman, the now well-known nurseryman and Select Councilman, Thomas Meehan, to take charge of the garden during the absence of its new proprietor in Russia. This offer was accepted, and Mr. Meehan took charge of the place, remaining there two years.

About a year later, Eastwick returned from Russia, and, as it was known that he intended to build a new residence, an architect, then unknown in the city, ascertaining the spot where he proposed to erect it, drew up, without consulting Mr. Eastwick, a plan, and came with it unasked to him, requesting that he examine it. Eastwick, in a pleasant and courteous way, told the architect that it was unnecessary to examine it, as he had in mind several houses he had seen in the old world, after some of which he intended to pattern his own.

He was finally induced, however, to look at the plan, and in an off-hand way indicated his objections to it, giving the architect a sufficient knowledge of his ideas to draw a more satisfactory one. Within a week or two the architect returned with a new plan, which came so near to Eastwick's ideal, that his visitor was engaged as architect of the building, which was built by a well-known Philadelphia builder, John Stewart. It was supposed by every one that the site of the residence would be somewhere within the

shade of the rare trees planted by Bartram, but so great was Eastwick's desire that every tree and shrub should be preserved to posterity, that he decided to build in what was then an open cornfield.

During the time the house was being built, the first two years of Eastwick's absence in Russia, his family occupied the old Bartram residence, and so great was his veneration for Bartram's memory and for everything belonging to the great botanist that, although he had the house thoroughly repaired, he permitted only those changes to be made in the nature of so-called improvements, and the house is still in much the same condition as when occupied by John Bartram and his son William.

Mr. Eastwick was not permitted to long enjoy this beautiful habitation, for at the outbreak of the Rebellion he met with severe financial losses, which crippled his resources to such an extent that it was difficult for him to maintain the establishment. During his lifetime, however, his earnest thought was for the preservation of the garden, and notwithstanding temptations to dispose of the property were continually offered, his love for the memory of Bartram was too great to permit him to part with it.

In the meantime, however, he was pressing various organizations in the city to secure and preserve it. Among these was the Pennsylvania Horticultural Society, which, however, was not in a financial position to accept his offers. None of these negotiations were successful. Previous to his death his fortunes revived somewhat, but it is believed he would have disposed of the entire property if he could have been assured that the garden would be preserved.

The garden was practically abandoned, after Mr. East-

wick's death, to the depredations of every passerby. The rare herbaceous and woody plants were uprooted and cut ruthlessly by local botanists, who carried away many rare plants in making herbarium specimens. The ground beneath the trees, in 1889, was covered by a luxuriant growth of many kinds of shrubs and herbaceous plants. The published accounts in the newspapers, of the picturesqueness of the old place, increased the number of visitors, who tramped down the plants and walked through the shrubbery, where before it was almost impossible to pass. The fields and meadow land was rented out by the Eastwick heirs for farming purposes, the farmer occupying the old Bartram House. City Councils, through the energy of Mr. Thomas Meehan, in 1889 placed upon the city plan the following small parks: Stenton Park, Bartram's Garden, Weccacoe's Square, Northwood and Juniata Parks.* The place was secured by the city in the early part of 1891, through the untiring energy of Mr. Meehan, who at one time had charge as head gardener of the old place under Mr. Eastwick.

The original garden comprised about five acres, beginning on the higher ground, a short distance west of the house, and extended beyond it toward the river. All of this land is included in the tract of about twelve acres, purchased by the City of Philadelphia. The city now owns,

* An Ordinance to appropriate for park purposes the land contained within the boundaries of Bartram's Garden, in the Twenty-seventh Ward; and Juniata Park, in the Twenty-fifth Ward; and Northwood Park, in the Twenty-third Ward.

Section 1, *The Select and Common Councils of the City of Philadelphia do ordain* that the land within the boundaries of Bartram's Garden, in the Twenty-seventh Ward, containing about eleven (11) acres, situated as follows: Bounded by Fifty-third Street, Eastwick Avenue, Fifty-fourth Street, and low water-mark of the Schuylkill River, excepting the right of way of the Chester Branch of the Philadelphia and Reading Railroad, etc., is hereby appropriated for park purposes, and the Mayor is hereby authorized and directed to agree, if possible, with the owners of said land as to the price of the same, subject to the approval of Councils.

but has not yet taken possession of, land adjoining on the north, and it has shortly acquired more of the Eastwick property adjoining on the south.

The first step toward reclaiming the gardens was taken October 18, 1895, when Chief Eisenhower, Professor Macfarlane, of the University of Pennsylvania, John F. Lewis, Forester of Fairmount Park, Talcott Williams and Eugene Ellicott visited the historic spot with an eye to restoring it. As a result of the visit Chief Eisenhower called on Provost Harrison, of the University, and secured from Mr. Harrison the promise of co-operation. The work of cleaning up the place was begun under the supervision of Dr. Macfarlane, of the University, who did much toward improving the place.

Early in April, 1896, a Committee of City Councils reported favorably a bill to take the Eastwick tract adjoining Bartram Park, as an addition to the Park. The only other historical fact of interest in connection with this historic place that need be mentioned in closing this account is the fire which occurred May 29, 1896.

"The uppermost floor and most of the roof of the Eastwick Mansion, which is just south of Bartram's Garden, on the Eastwick property, that Councils have just decided to purchase for the city, were destroyed. The damage is estimated at $12,000, which is covered by insurance.*

"The mansion is a commodious three-story structure, containing about thirty-five rooms. There were three families residing in the house, presumably as caretakers of the place.

"The alarm was sent in at 8.52 o'clock, but before the

* *Public Ledger*, May 30, 1896.

fire engines could reach the spot the flames had spread over a considerable portion of the roof. The fire originated at the north-west corner of the building, and practically the whole of the third story was destroyed. The firemen succeeded in keeping the flames out of the tower on the south-east corner, but it was undermined to such an extent that it may have to be torn down. The lower floors were saved, but the ceilings and walls of the spacious rooms were badly damaged by water.

"Although the property has now been secured by the city for a public park, to the satisfaction of everyone interested in the early history of the city, it will be seen from the above account that the preservation of this historic and beautiful garden is really owing to the earnest desire of Mr. Eastwick to have it preserved for all time.

"It will be noted that the burned building is on that portion of the property which Select Council decided to purchase as an addition to the part before taken for a public park. The present owners entered heartily into the desire of their father for the preservation of everything connected with Bartram, and had been anxious for the city to own this addition. They generously proposed in the negotiations to leave completely out of consideration the house, looking only to the absolute value of the ground.

"It had been the thought of Mr. Eisenhower, Chief Commissioner of City Property, to use the Eastwick building for free library purposes. In this sense the destruction of the building may be considered a loss."*

* The building has since been torn down. The Bartram Association has started (1899) a botanical library which occupies one of the rooms of the old house. A considerable number of books presented by the courtesy of friends repose on the book shelves, and a number of interesting relics recently collected also add much to the interest of the place. Meetings organizing the memorial library were held at the University of Pennsylvania on March 23rd, and at the Pennsylvania Historical Society on April 10, 1899.

PETER KALM,

Peter Kalm,* a celebrated naturalist, and pupil of Linnæus, was a native of Finland, born in the year 1715. Having imbibed a taste for the study of natural history, he pursued his inclination with much zeal and industry. His reputation as a naturalist caused him to be appointed professor at Abo; and in October, 1747, at the instance of Linnæus, he set out upon his travels, sailing from Guttenburg for America, where he arrived the ensuing year. Having spent two or three years in traveling through Canada, New York, Pennsylvania and the adjacent provinces, he returned to his professorship at Abo, in 1751. His discoveries in botany materially enriched the Species Plantarum of his great master. Professor Kalm's travels in America† were published in Sweden. A German edition ‡ of this interesting book soon appeared, and was followed in 1772 by an English one. He seems to have been remarkably credulous; and, moreover, it is alleged, took to himself the credit of some discoveries which rightfully belonged to John Bartram. He died at Abo, November 16, 1779. His name has become enduringly associated with a genus of most elegant evergreen shrubs.

HUMPHRY MARSHALL.

Humphry Marshall § was born in the township of West Bradford, county of Chester, and province of Pennsylvania, on the 10th day of October, 1722. His father, Abraham Marshall, was a native of Gratton, in Derbyshire,

*1849. DARLINGTON—*Memorials of Bartram and Marshall*, 367.

†1753-61. KALM—*En Resa til Norra America.* Stockholm, III vols., 484 pp.

‡1754-64. (German edition) *Bescreibung der Reise nach dem nördlichen Amerika* Göttingen. 3 Theile.

§1849. DARLINGTON—*Memorials of Bartram and Marshall*, 485.

England, born in the year 1669, came to Pennsylvania about the year 1697, and settled near Darby, where, on the 17th of January, 1702–3, he married Mary, the daughter of James Hunt, of Kingsessing, also an emigrant from England, and one of the companions of William Penn. Some time after their marriage, viz., in the year 1707, Abraham Marshall removed to the forks of the Brandywine, near the western branch of that stream, where he purchased large tracts of land among the Indians, and continued to reside there until his death, which took place December 17, 1767, at the age of about ninety-eight years. His wife died in the spring of 1769, aged eighty-seven years. They were both interred in the Friends' burying ground at Bradford Meeting-house. Of their nine children, Humphry was the eighth. In those primitive times, the opportunities for schooling were scanty and limited. Humphry Marshall used often to state that he never went to school a day after he was twelve years of age; and consequently was only instructed in the rudiments of the plainest English education. Being constitutionally robust and active, he was employed in agricultural labors until he was old enough to be apprenticed to a stone-mason. This trade he learned, and followed for a few years, during the summer season, extending his engagements, occasionally into the county and town of Lancaster, and also into the neighboring province of New Jersey. The winters were passed at the residence of his father.

That he was an excellent workman is still evident from the walls of his residence at Marshallton, which he built with his own hands, in the year 1773.

On the 16th of September, 1748, Humphry Marshall

MARSHALL'S HOUSE IN 1884 (FRONT).

UNIVERSITY OF MICHIGAN
LIBRARY

was married to Sarah, daughter af Joseph Pennock, of West Marlborough, in Chester County. After his marriage he took charge of his father's farm, near the west branch of the Brandywine. He seems about this time to have turned his attention earnestly to the acquisition of knowledge, evincing a decided partiality for astronomy and natural history. As an evidence of his devotion to literary and scientific pursuits, it may be mentioned, that his name is found, written with his own hand, so early as 1753, in Coles's *Latin Dictionary*, Quincy's *Medical Lexicon*, Gerard's *Herbal*, and in a *Treatise on Navigation*, and several other works of similar character, which he had procured about that period.

That he possessed the confidence of his fellow-citizens is shown by his appointment to be County Treasurer, in 1762, in which office he was continued until the year 1766, inclusive.

In 1764 it became expedient to enlarge the dwelling in which he resided with his parents. This addition was built of brick, and the entire work of digging and tempering the clay, making and burning the bricks, and building the walls, was performed by Humphry himself. He also erected a greenhouse adjoining the dwelling, which was, doubtless, the first conservatory of the kind ever seen or thought of in Chester Country.

At his father's death, in 1767, Humphry Marshall came into full possession of a large portion of the patrimonial estate, which he had previously held as a tenant, paying a moderate annual rent. He now erected a grist-mill, and made other considerable improvements on the premises, and continued thereon until 1774, when he removed to his newly-erected dwelling on a tract of land

which he had purchased, near the Bradford Meeting-house, adjoining the site of the present village of Marshallton. The botanic garden was founded in the year 1773. The same year the Legislature of Pennsylvania established a loan office, and appointed Humphry Marshall one of the trustees. These trustees were continued in office until December, 1777, when, owing to difficulties in the discharge of their duties—arising out of the Revolutionary conflict—they neglected or refused longer to serve, and were superseded.

In 1780 Humphry began to prepare an account of the forest trees and shrubs of this country, which was completed and printed in the latter end of the year 1785, under the title of "Arbustrum Americanum: the American Grove, or, an Alphabetical Catalogue of Forest Trees and Shrubs, natives of the American United States." It forms a duodecimo volume of one hundred and sixty-nine pages; and is believed to be the first truly indigenous botanical book published in this western hemisphere. The arrangement, being alphabetical, is rather inconvenient, and ill-suited to investigators, who are acquainted with the genera. The descriptions are in accordance with the Linnæan system, and are, for the most part, faithful and satisfactory. The book is dedicated to the officers and members of the American Philosophical Society, and was for that day, and under the circumstances, a useful and highly creditable performance.

On the 29th of March, 1785, Humphry Marshall was elected an honorary member of the *Philadelphia Society for Promoting Agriculture*, "the Society inviting his assistance." And in February of the following year he sent them an

essay on the importance of botanical knowledge to the cultivators of the soil.

Men of science in our land now began to be aware of the existence and meritorious labors of the unpretending farmer and gardener of West Bradford; and we learn, from his certificate, that on the 20th of January, 1786, he was elected a member of the American Philosophical Society.

On the 27th of July, 1786, Humphry lost his first wife, who died at the age of nearly sixty-six years, and on the 10th of January, 1788, he again married. This second wife was Margaret, daughter of Thomas Minshall, of Middletown (then of Chester), Delaware County. He had no offspring by either marriage.

A genus of plants, belonging to the natural family of *Compositæ*, was dedicated in 1791 by the botanist, Schreber, to Humphry Marshall and his nephew;* for which, it would seem, they were partly indebted to the kind interposition and friendly attention of Dr. Muhlenberg, the correspondent of Schreber.

In the latter years of his life Humphry's vision was greatly impaired by cataract, for which the operation of couching was performed by Dr. Wistar in 1793, with but partial success. It was proposed to be repeated in the year 1800, and preparation, made with that view, as may be gathered from some of Dr. Wistar's letters; but it was the opinion of his relatives of the following generation that the operation was not performed. His sight, however, was never so entirely lost, but that he could discern the walks in his garden, and recognize the localities of his favorite plants.

But even while yielding to the infirmities of age,

* See page 104, where this statement is questioned.

he continued to take a lively interest in whatever concerned the welfare and progressive improvement of society. Among the latest manifestations of his zeal, in that behalf, may be mentioned his co-operation with some active philanthropists in procuring the erection of a county almshouse, for the accommodation of the sick and infirm poor; and, especially, the aid and counsel he afforded in projecting and organizing the valuable institution for the education of youth, the Westtown Boarding School, established by the Society of Friends, near the close of the eighteenth century.

His life, having been protracted to a good old age, Humphry Marshall finally sank under an attack of dysentery, on the 5th of November, 1801, aged seventy-nine years and twenty-five days. His second wife survived him nearly twenty-two years, dying August 6, 1823, aged eighty-two years. Humphry and both his wives were interred in the same burial ground with his parents, at the Bradford Meeting-house.

In person, Humphry Marshall was about the medium size, erect and robust, with features strong, yet regular; his forehead, square and ample. His eyes were dark gray; his hair dark, inclining to sandy; his mein rather grave and reserved, but his manners inspiring respect, confidence and esteem.

The Botanic Garden, at Marshallton, was planned and commenced in the year 1773, and soon became the recipient of the most interesting trees and shrubs of our country, together with many curious exotics, as also a numerous collection of our native herbaceous plants. For several years prior to the establishment of the Marshallton garden,

MARSHALL'S HOUSE, MARSHALLTON IN 1896 (FRONT).

UNIVERSITY OF ARIZONA
LIBRARY

Humphry had been much engaged in collecting native plants and seeds, and shipping them to Europe; but after that event, being aided by his nephew, Dr. Moses Marshall, he greatly extended his operations, and directed his attention to the business of exploring and making known abroad the vegetable treasures of these United States.

In 1849, when Darlington wrote his "Memorials of Bartram and Marshall," he stated "that a large portion of these survive, although the garden, from neglect, has become a mere wilderness; while a number of our noble forest trees, such as oaks, pines and magnolias (especially *Magnolia acuminata*), all planted by the hands of the venerable founder, have now attained to a majestic altitude."

An editorial in *Garden and Forest* * and an article in the Philadelphia *Times* † describe the garden as it appeared in 1893 and 1894, respectively. The house is still embowered by trees planted by the hands of the father of American dendrology. On the acre or two of ground which surrounds the house may be seen growing close by the driveway one of the largest and most perfect specimens of *Quercus heterophylla*. It was raised from an acorn brought by Marshall from the original tree of this species, discovered by John Bartram in the neighborhood of his place on the banks of the Schuylkill. Not far away from this great oak is a splendid cucumber tree, *Magnolia acuminata*, with a remarkably thick trunk and unusually stout branches, and altogether, one of the noblest specimens of this fine tree that may be seen anywhere. These two trees are probably the most remarkable of those planted by Marshall now growing in his arboretum.

*1893. *Garden and Forest*, vi: 461.
†Philadelphia *Times*, June 3, 1894.

There are, however, quite a number of large, black birches left, a tall, long-stemmed hackberry of great size, some yellow buckeyes, a European larch, several rhododendrons (*R. maxima*), which have grown into trees with short, thick stems, and four or five very large and fine ailanthus trees, which must have been among the first specimens of this tree planted in America. There are also some remarkable box trees, and until a short time ago, when it was blown down in a severe storm, probably the largest cherry tree in this part of Pennsylvania was growing in the garden. It was a common black cherry, but had attained an enormous height. "I got nearly $70 worth of good wood out of that tree," said Mr. Lilley, "and there would have been nearly twice that much if the tree hadn't been so rotten in parts on account of its great age." There were indications about the garden that many other trees had once grown there, but had been felled. Mr. Lilley acknowledged their destruction; but said it was necessary, as the shade was too dense. Not long ago he also had the thick undergrowth of shrubs, many of them rare varieties and planted by Marshall himself, cleared away when a general tidying up took place.

Humphry Marshall's old house faces the highway, but stands some distance back from it, being shut off from the street by the gardens. It is a larger house than the little stone building of Bartram's on the Schuylkill, and more pretentious in many ways, yet it was erected by Marshall, with his own hands, in the year 1773.

In one corner of this dwelling he contrived a small but convenient stove, or hot house, and immediately above from the second story he projected a little observatory in which to indulge his fondness for astronomical observations.

An excellent idea of the appearance of the house in the beginning of this century is to be had from the illustration in Darlington's book, the "Memorials of Bartram and Marshall" (1849). The projecting bay window* toward the south-west was torn down by the present owner, because it had become insecure, and the front of the house was walled up around a window newly constructed to take the place of the wooden observatory, which opened into the room supposed to have been Marshall's study. †

The present owner is Robert B. Lilley, who purchased the place some thirty odd years ago from the Marshall heirs. Mr. Lilley, although he has allowed the garden to go into decay, has kept the old house in a perfect state of preservation. It abounds in curiously-shaped rooms, queer cupboards and odd closets. In the kitchen is to be seen the old fire-place, with its swinging crane, before which Marshall used often to sit on winter evenings diligently at work, after a hard day's labor on the farm, on his book, Arbustum Americanum. ‡ Many quaint old pieces of furniture and a very handsome antique grandfather's clock are found in the house. The clock occupies a place built for it by Marshall in a nook in wall in a front room which the botanist occupied as his sleeping apartment. In another room was a quaint old china cupboard, in which were several antique pieces of old-fashioned blue and white Canton chinaware, very rich in coloring. A visit of the writer on May 22, 1896, confirmed the facts of the above statements written in 1893 and 1894. The garden has been allowed to go to ruin and decay, but the house is still in an excellent state of preservation.

* This was still in existence in 1884, when R. S. Redfield took the photograph reproduced for this book.

† See photograph taken by the author. ‡ Marsball has it, Arbustrum.

WILLIAM BARTRAM.

William Bartram, the fifth son of the botanist, John Bartram, was born at Kingsessing, Penna., February 9, 1739, inheriting his taste for botany from his father. He was his father's companion in several botanical journeys, affording him much assistance. As William was never married, he continued to reside in the old home with his brother John, also a botanist, to whom the garden descended by his father's will.

William traveled extensively in the Southern states, and an exhaustive account of these journeys appeared in a book entitled: "Travels Through North and South Carolina, Georgia, East and West Florida," 1791.* After his return from his tours he devoted himself to science, and in 1782 was elected professor in the University of Pennsylvania, which post he declined on account of failing health.†

So far as can be ascertained, he was the first botanist who visited the southern portion of the Alleghanies. Under the auspices of Dr. Fothergill,‡ to whom his collections were principally sent, William Bartram left Philadelphia in 1773, and after traveling in Florida and the lower part of Georgia for three years, he made a hurried visit to the Cherokee country in the spring of 1776. On this trip he

* 1791. W. BARTRAM—*Travels through North and South Carolina, Georgia, East and West Florida, etc., containing an account of the soil and natural productions of those regions*, Philadelphia. Reprinted at London for J. Johnson, 1794, pp. xxiv, 520 ind. 8 tab.

† For portrait of Wm. Bartram, see "Poineers of Science in America," edited and revised by Wm. Jay Youmans (Appleton) 1896, p. 24. An oil painting of Wm. Bartram reposes at the Pennsylvania Historical Society.

‡ John Fothergill (1712-1780) was a native of Wesleydale in Yorkshire, and a distinguished physician in London, where he lived from 1740 till his death. In 1762 Dr. Fothergill planted on his estate in Essex a collection of trees and shrubs, which was at that time considered one of the most important in England. Silva of North America. Sargent, VI, p. 16. Amer. Jour. Sci., XLII.

ascended the Seneca, or Keowee River, one of the principal sources of the Savannah, and crossing the mountains which divide its waters from those of the Tennessee, he continued his journey along the course of the later to the borders of the present state of Tennessee. Finding that his explorations could not safely be extended in that neighborhood, he retraced his steps to the Savannah River, proceeding thence through Georgia and Alabama to Mobile. His well-known and interesting book contains numerous references to the botany of these regions, with occasional popular descriptions, and in a few cases Latin characters of some remarkable plants, as for example, *Myrica inodora* (Travels, 1791, p. 405), discovered at Appalachicola, Fla., *Rhododendron punctatum, Stuartia pentagyna, Azalea calendulacea, Trautvetteria palmata, Magnolia Fraseri.*

After his return to Philadelphia he devoted himself to science; was elected professor in the University of Pennsylvania in 1782, which post he declined on account of failing health. He published, besides his travels, the most complete and correct list of American birds, prior to the work of Alexander Wilson, who was greatly assisted, and in fact was persuaded by William Bartram, to undertake that splendid production, "The American Ornithology."

The greater number of the plates of Barton's "Elements of Botany" (1803) were engraved from the original drawings of Wm. Bartram, who, although never married, found consolation in the pursuit of science, his life being spent, when not away from Philadelphia, in looking after and caring for the many interesting plants in the old garden inherited by John Bartram, fil. William lived with his niece, Nancy, who married Col. Robert Carr, until his

death, which occurred by the rupture of a blood vessel in the lungs July 22, 1823.* Col. Robert Carr undertook the care of the garden, which was in most excellent condition, when a committee of the Pennsylvania Horticultural Society visited it in 1830.

ADAM KUHN, M. D.

Adam Kuhn, M. D., was born at Germantown, Philadelphia, November 17th, 1741 old style. His grandfather, John Christopher Kuhn, and his father, Adam Smith Kuhn, were natives of Farfeld, a small town near Heilbronn, on the Neckar, in the circle of Swabia. They both came to Philadelphia in September, 1733.†

Dr. Adam Kuhn's first studies in medicine were directed by his father, until the autumn of 1761, when he sailed for Europe and arrived at Upsal, by the way of London, in the beginning of January, 1762, having traversed Norway and part of Sweden. He studied medicine and botany under Linnæus, and the other professors of the University of Upsal, until July or August, 1764, when he returned to London, where, it is believed, he remained a twelve-month. The particular estimation in which he was held by Linnæus will be sufficiently manifested by the letters of that eminent man addressed to Dr. Kuhn, and published in the 8th volume of the "Eclectic Repository." They will also serve to show his unremitted attention to his studies.

At what time Dr. Kuhn went to Edinburgh cannot be precisely ascertained. He took his degree of Doctor of Medicine in that University the 12th day of June, 1767.

* 1849. DARLINGTON—*Memorials of Bartram and Marshall*, p. 288.

† In the main lecture hall of the College of Physicians, Philadelphia, 13th and Locust Streets, is an etching of Adam Kuhn by Albert Rosenthal.

The thesis published by him, "De Lavatione Frigida," was dedicated to his friend and instructor, Linnæus.*

He visited France, Holland and Germany, but whether before or after his residence at Edinburgh, is not known.

In the month of January, 1768, he returned from London to his native country, and settled in Philadelphia, where he quickly rose to a high degree of estimation amongst his elder medical brethren, and soon succeeded to the most respectable practice. He was appointed professor of materia medica and botany in the College of Philadelphia (now the University of Pennsylvania), in January, 1768, and commenced his first course of botany in May following. He was probably the first professor of botany in this country, yet, though he had the advantage of studying under the illustrious Swede, and was said to have been a favorite pupil, it does not appear that he ever did much for the science.

In May, 1775, Dr. Kuhn was elected one of the physicians to the Pennsylvania Hospital, which he attended until his resignation in January, 1798, having served the institution, with his usual diligence and faithfulness, upwards of twenty-two years.

The Philadelphia Dispensary, for the medical relief of the poor, the first institution of its kind in the United States, was founded in 1786. Dr. Kuhn was appointed one of the consulting physicians, and ever proved himself to be amongst the foremost of its steady friends and patrons.

The College of Physicians of Philadelphia was established in 1787, of which Dr. Kuhn was always an active member. On the decease of Dr. William Shippen, in July,

* 1828. THACHER—*American Medical Biography*, I, 349.

1808, he succeeded him as president, and was continued during his life in this distinguished station.

In November, 1789, he was appointed professor of the theory and practice of medicine in the University of Pennsylvania, and on the junction of the two medical schools of the College and University, was chosen professor of the practice of physic in January, 1792. In 1797 he resigned his medical chair. As a teacher, he was faithful and clear in the description of diseases, and in the mode of applying their appropriate remedies, mostly avoiding theoretical discussions. His lectures were eminently calculated to form useful practitioners in the healing art, to the promotion of which his whole life was devoted. Dr. Kuhn was also a member of the American Philosophical Society, and an honorary member of the Massachusetts Medical Society.

Of his writings nothing can be recollected but his thesis and a short letter addressed to Dr. John Coakley Lettsom, on the diseases succeeding the transplantation of teeth, which was published in the first volume of the "Memoirs of the Medical Society of London."

Dr. Kuhn was not remarkable for the powers of imagination, but in sound judgment he greatly excelled. His talent for observation was profound. He was, through life, a studious reader, a lover of music from his youth, remarkably abstemious and regular in his diet, and neat in his person. During a long and active attention to the duties of his profession, he enjoyed so much health as to use his carriage only in inclement weather. A most prominent feature in his character was a strict punctuality and observance of all his engagements. He was married in May, 1780, in the island of St. Croix, to Elizabeth, daughter

of Isaac Hartman, Esq., by whom he had two sons. For some time before his death his bodily strength began to fail, which induced him, in the autumn of 1815, to relinquish his practice, to the great regret of the families whom he had attended. A genus, *Kuhnia*, of compositous plants was named by Linnæus in honor of Kuhn.

After a confinement to the house of about three weeks, he expired July 5, 1817, aged seventy-five years, without pain, and fully sensible of the approaching dissolution.

DAVID LANDRETH.

David Landreth * (1752-1836) was born at Brunswick on the Tweed, the son of a Northumberland farmer. Having learned the trade of nurseryman, he emigrated to Canada in 1781, removing afterward to Philadelphia, where in 1786, in partnership with his brother Cuthbert, he started the nursery and seed business, still carried on by his descendants. In 1804 or 1805 David Landreth obtained from the Lewis and Clark expedition seeds of the Osage Orange, from which was grown a number of trees. One of these was planted in front of the old Landreth mansion on the ground now occupied by the Landreth Public School, 22nd and Federal Streets. It was a pistillate plant, and never fruited until fertilized by pollen, brought from a tree growing in M'Mahon's garden. David Landreth, and his successors of the same name are not botanists in the strict sense of the term, although their knowledge of plant life is very intimate and precise. Bloomsdale farm is an example of how a seed farm should be maintained. Situated on the Delaware River, near Bristol, it commands the trade of New York and Philadelphia.

* 1895. SARGENT—*Silva of North America*, VII, 87. See Biography of R. Buist.

GOTTHILF H. E. MUHLENBERG.

The late Prof. John M. Maisch, in an address on Muhlenberg as a botanist, * emphasized the frequency with which his name is met in works of systematic character as that of an original describer.

Members of the Muhlenberg family were conspicuous in the early history of the United States. Pastor Heinrich Melchior Muhlenberg, who came to Philadelphia by way of Charleston, S. C., in 1742, was the patriarch of the Lutheran Church in the United States. His eldest son, Pastor Johann Peter Gabriel, was a major-general in the Revolutionary War, Vice-President of Pennsylvania, a member of the House of Representatives of the United States, a United States Senator, and a well-known revenue officer. Another son, Friedrich August, also a minister of the gospel, was a member of the Continental Congress, a member and speaker of the Pennsylvania Legislature, and a member of the House of Representatives.

Gotthilf Heinrich Ernst Muhlenberg, the third son and the botanist and scientist of this distinguished family, was born in New Providence, Montgomery County, Pa., November 17, 1753, and died in Lancaster, Pa., May 23, 1815.† He attended schools in his native place and in Philadelphia, to which city his family removed in 1761. When he was ten years old he went with his brothers to Halle, to finish his studies and prepare for the ministry. After a visit to Einbeck, his father's native place, he entered a school in

* Delivered before the Pioneer Verein of Philadelphia, May 6, 1886, and published in Dr. Fr. Hoffman's *Pharmaceutische Rundschau*, June, 1886; also separately. See *Popular Science Monthly*, XLV, 689. Portraits.

† See portrait in color. A portrait of him appears in "Pioneers of Science in America," Edited and Revised by W. J. Youmans. Appleton's, 1896, p. 58.

C. Peale pinx.t *Grattman & Piggot*

GOTTHILF HEINRICH ERNST MUHLENBERG.

UNIVERSITY OF ARIZONA
LIBRARY

Halle, continuing here for six years. He entered the University in 1769, but remained in attendance only about a year. He returned to Pennsylvania in 1770, was ordained by the synod of his church, and assisted his father in pastoral work. In 1774 he was called to a charge in Philadelphia, and later, in 1780, to be pastor of the Lutheran Church at Lancaster, where he spent the rest of his life. Mr. Muhlenberg wedded, in 1774, Catherine, daughter of Philip Hall, of Philadelphia. He had two sons; one of them, Henry Augustus won a high, reputation as clergyman, and afterward as a man of public affairs. The other son, Frederick Augustus, became a physician at Lancaster, Pa.

His work in botany began during his sojourn in the country following his flight from Philadelphia. He pursued the science earnestly after his return to the city, and became intensely interested in the less conspicuous flowering plants and cryptogams.

It was not long before Muhlenberg entered into correspondence with other botanists. Dr. Johann David Schöpf, a Hessian, stationed in New York during the Revolutionary War, who traveled through the Eastern states to Florida, after the conclusion of peace, in search of medicinal plants, became acquainted with Muhlenberg, and was aided by him. After his return to Germany he was the occasion of a correspondence between Muhlenberg and Prof. Schreber, of Erlangen. Later, Muhlenberg corresponded with other eminent botanists in Germany, England, France and Sweden, as well as with Americans.

Like a true naturalist, Muhlenberg exercised the greatest care and thoroughness in observation and research.

He was able to inform Dr. Cutler, in the spring of 1791, that he had collected more than eleven hundred different plants within a radius of three miles of Lancaster. In a letter dated November 8, 1791, he wrote: "I am collecting, as far as possible, all I can learn concerning the medicinal and economic uses of our plants and am writing it down. If the medicinal application seems to be sufficiently confirmed from different sides, and agrees with the character of the plant, I either try it on myself or commend it to my friends. I raise most of the grasses in my garden, and experiment how often they can be cut, and whether they are readily eaten by horses or cattle." An exchange was made with Prof. Schreber, of American plants for foreign grasses; and, besides mosses, grasses of New England were obtained from Dr. Cutler, especially such as grew near the sea.

Muhlenberg furnished Dr. Schöpf with notes on the medicinal properties of plants, some of these for use in his contemplated work on American Materia Medica. When that work was published in 1787, the author most ungratefully omitted to mention his indebtedness to Muhlenberg. Similarly, when Muhlenberg first saw a copy of Bigelow's "Medical Botany," he could not help remarking after looking through it: "This gentleman has appropriated to himself all my explanations, without making any acknowledgments."

Muhlenberg presented to the American Philosophical Society in July, 1785, an outline of a "Flora Lancastriensis," containing the results of his observations on plants and their habits, and, at the same time, a manuscript calendar of flowers. In February, 1791, he communicated his "Index Flora Lancastriensis." This is arranged according to the

artificial system of Linnæus, and contains four hundred and fifty-four genera, with nearly eleven hundred species, including both feral and cultivated plants. A supplement to this Index, which appeared in the "Transactions of the American Philosophical Society," in September, 1796, contained forty-four additional genera, with sixty-two species of phanerogams, of which nine were unknown species of grasses, while the cryptogams were represented by 226 additional species, belonging to 29 genera.

In 1809 Muhlenberg decided to write a catalogue of the then known native and naturalized plants of North America.*

Muhlenberg conscientiously referred to the books which he had used in the determination of his collected plants, and gave credit to correspondents in different parts of the United States, who had assisted him in his researches by sending plants or seeds. He also made, at the same time, a complete description of the plants growing around Lancaster, and likewise a complete description of all other North American plants, which he had himself seen and arranged in his herbarium. Unfortunately, they were never published.

A part of these works, dealing with the grasses, was printed in 1817, two years after the author's death, under the title, "Descriptio uberior Graminum." † The manuscript of it was presented by Zaccheus Collins, a friend of Muhlenberg, to the American Philosophical Society in 1831.

---

* *Catalogus Plantarum Americæ Septentrionalis huc usque Cognitarum Indigenarum et Cicurum; or, a Catalogue of the Hitherto Known Native and Naturalized Plants of North America, arranged according to the Sexual System of Linnæus.* By Henry Muhlenberg, D. D., Minister at Lancaster, in Pennsylvania, Lancaster. William Hamilton, 1813, octavo pp. iv, 112.

† *Descriptio Uberior Graminum et Plantarum Calamiarum Americæ Septentrionalis Indigenarum et Cicurum.* Auctore Dr. Henrico Muhlenberg. Philadelphia. Solomon W. Conrad, 1817, octavo pp. ii, 295.

Muhlenberg's valuable herbarium was bought by a number of his friends for a little more than five hundred dollars, and was presented to the American Philosophical Society in February, 1818. It was then in good condition, but has, unfortunately, being allowed to suffer from neglect until it is no longer of any value.

His services to science have been well recognized by botanists. A golden rod was given by Torrey and Gray the name *Solidago Muhlenbergii;* a small willow was denominated by Barratt *Salix Muhlenbergiana;* Grisebach named a centaury *Erythræa Muhlenbergii;* Gray gave the name *Muhlenbergii* to a species of reed or sedge, and Schreber the name *Muhlenbergia* to a genus of grasses. Two mosses of the genera *Phascum* and *Funaria* were named in honor of Muhlenberg by Schwartz; two lichens of the genera *Umbilicaria* and *Gyrophora* by Acharius; and, by Elliott, a fungus of the genus *Dothidea.*

About half of the plant names, given by Muhlenberg, which are now recognized, belong to the plants of the natural orders, *Cyperaceæ* and *Gramineæ*, in the study of which he was supported by Schreber.

This review of Muhlenberg's botanical work would not be complete without special reference to his scientific correspondence, his personal intercourse with naturalists, and degrees conferred. Among his foreign correspondents were Dillenius, Hedwig, Hoffmann, Persoon, Pursh, Smith, Schöpf, Schreber, Sturm, Willdenow, William Aiton, Batsch, Palisot de Beauvais, Schkuhr, Heinrich Adolph Schrader, of Göttingen; Kurt Sprengel at Halle, and Prof. Olof Schwartz, one of Linnæus's most eminent pupils. Muhlenberg also had as home correspondents Rev. Christian Denke, of Nazareth, Pa.; the Rev. Samuel Kramph, of North

Carolina; the Moravian bishop, Jacob Van Vleck, and Dr. Christian Müller, of Harmony, Pa. One of his most valued correspondents was Dr. Baldwin, of South Carolina, and their correspondence has been published by William Darlington in a book entitled *Reliquiæ Baldwinianæ.** He entertained largely at his home at Lancaster. Alexander von Humboldt and Aimé Bonpland sought him there on their return from their long journey in Spanish America.

The University of Pennsylvania conferred on him the degree of Master of Arts in 1780, and Princeton College that of Doctor of Divinity in 1787. He was made a member of the American Philosophical Society on January 22, 1785. He received diplomas and awards from the Imperial Academy of Erlangen, 1791; the Society of Friends of Natural History, Berlin, 1798; the Westphalian Natural History Society, 1798; the Phytographic Society of Göttingen, 1802; the Academy of Natural Sciences of Philadelphia, 1814; the Society for the Promotion of the Useful Arts, Albany, N. Y., 1815; the Physiographical Society of Lund, Sweden, 1815; and the New York Historical Society, April 12, 1815, not quite six weeks before his death, at Lancaster, May 23, 1815.

MOSES MARSHALL.

Moses Marshall, † son of James Marshall (the younger brother of Humphry), was born in West Bradford, Chester County, on the 30th of November, 1758. After receiving a tolerable education, both English and classical, he studied

* 1843. DARLINGTON—*Reliquiæ Baldwinianæ.* Philadelphia. Kimber et Sharpless, pp. 346, effigies Baldwini.

† This sketch was written by Dr. Wm. T. Sharpless, *West Chester Daily News*, Nov. 22, 1895.

medicine with Dr. Nicholas Way in Wilmington, Del., from 1776 to 1779. He had an extraordinary opportunity of being initiated into surgery in attending the soldiers who were wounded in the battle of Brandywine, September 11, 1777. After practicing medicine a short time, he seems to have become an inmate in the family of his uncle, Humphry, devoting his time and services exclusively as an aid to his uncle in the business of collecting and shipping plants and seeds to Europe. He made several long exploring journeys in that pursuit through the wilds of the West and Southwest. He was a good, practical botanist, well acquainted with most of our indigenous plants, and rendered valuable assistance to his uncle in preparing the *Arbustum Americanum*. On the 6th of April, 1796, Governor Mifflin appointed him a Justice of the Peace, in which office he did excellent service as a peace-maker in the community around him. In all his acts he was a remarkably cautious, upright, conscientious man. Dr. Marshall discontinued the business of sending seeds and plants to Europe soon after his uncle's death, and the garden, in consequence, was almost wholly neglected. Dr. Marshall died on the first of October, 1813, aged fifty-four years and ten months.

He was the son of James and Sarah Marshall, and the grandson of Abram Marshall, who came from Gratton, in Derbyshire, England, to Darby, Delaware County, about the year 1697. A few years later he bought a large tract of land on the west branch of the Brandywine, near the forks (part of which is now occupied by Abram Marshall, a descendant), where he died in 1767. Abram Marshall married Mary Hunt, whose sister, Elizabeth Hunt, married William Bartram, so that their

son, John Bartram, the first American botanist, was a first cousin of the Chester County botanist, Humphry Marshall, and of James Marshall, the father of the subject of this sketch.

The first authentic record we have of Dr. Marshall is the following document:

"Memorandum of an agreement made and concluded upon between James Marshall, of Chester County, and Dr. Nicholas Way, of Wilmington, in the County of New Castle, as followeth, viz.: The said Dr. Way undertaketh to instruct Moses Marshall, the son of the said James, in the art of physick, according to the best of his understanding, for the space of two years, which time the said Marshall is to abide with him and his wife. He is to find and allow him sufficient meat, drink and lodging during said term. And in consideration thereof the said Marshall is to give the sum of seventy-five pounds, the one-half now and the other half in one year from this date. Witness of our hands the first day of November, 1776."

Dr. Nicholas Way, who thus became the preceptor of Moses Marshall, had been settled in Wilmington for some time, having received the degree of Bachelor of Medicine in the first class that graduated in the Medical Department of the University of Pennsylvania, and, in fact, the first class that graduated in medicine in this country, in 1768; and in 1771 he received the further degree Doctor of Medicine. At the same time a cousin of Moses Marshall, Abram Baily, also from Marshallton, was a pupil with Dr. Way.

Moses Marshall never received any medical degree, none being at that time, or for nearly a hundred years

133210

afterward, required in order to practice medicine in Pennsylvania. The first to receive such a degree, who settled in Chester County, was Dr. Darlington, in 1804. But it was customary after serving two or more years as an apprentice in a doctor's office to attend one or two courses of lectures at the University of Pennsylvania. Accordingly, we find that the advice of Dr. Thomas Parke was asked relative to Moses Marshall spending the winter in Philadelphia for this purpose. Dr. Parke was a native of Chester County, had taken his medical degree at Edinburgh, had an extensive practice in Philadelphia, and was one of the physicians to the Pennsylvania Hospital. He advised him to attend the lectures, especially those on anatomy, by Dr. William Shippen, and those on chemistry, by Dr. Rush. The winter of 1779 and 1780 was spent in this manner, and his diary covering the period has been preserved. The entries are short and relate mostly to his own doings, though he occasionally gives us some comment on the times. There is nothing to indicate that he realized that in sitting under the teaching of Dr. Rush he was brought into almost daily contact with the most dignified and exalted character that has graced the annals of American medicine.

It must be admitted that some entries in Moses Marshall's diary at this time indicate that his time was not exclusively devoted to medical studies and scientific work, for a certain Polly Howell receives more frequent mention than does the immortal Rush, and Sally Samson, who "behaved for three evenings, especially the last, in a most engaging manner," evidently occupies his thoughts more than hospital clinics or work in Parke's shop.

He then returned to Marshallton, and after staying at

his father's, doing nothing of account for a year, and spending another year keeping a sort of apothecary shop in Wilmington, which, he says, "came to nothing and less," that in the spring of 1782 he "came up into the country and inoculated for the small-pox about Londongrove, making his home at Samuel Sharp's, and afterward about Kennett with Dr. Pierce, making a home there." After inoculation was over, in the spring of 1782, he stayed at his father's, professing to practice medicine, but really doing very little, if we may judge from his diary, until 4th month 27th, 1784, when he became an inmate of the family of his uncle Humphry. The years of 1782 and 1783 appear to have been unprofitably spent, and his diary indicates that at that time he was drifting into idle company and questionable habits.

Having laid aside his youthful follies, and having found occupation that was agreeable and suited to his talents, we enter upon the period of his scientific work from 1784 to 1801.

It is difficult to determine when Dr. Marshall began the study of botany. His intimacy with his uncle Humphry and a few entries in his diary suggest that he had made a beginning before he entered his uncle's family, and in 1786 the latter, in a letter to Sir Joseph Banks, the President of the Royal Society of London, solicits employment for Dr. Marshall, and suggests that if the society should want any one on this side the water to explore our western region in search of botanical specimens, fossils, minerals or inflammables, that Dr. Marshall would be willing to serve them, and states that he is "well versed in the knowledge of botany."

Humphry Marshall also writes to Benjamin Franklin in 1785, and suggests that his cousin, William Bartram, and his nephew, Dr. Marshall, would be willing to explore the western part of the United States if they should meet with proper encouragement, and thinks that the Philosophical Society, or possibly Congress, would give them substantial support. This appears to have been the work that the elder Marshall had mapped out for him, and it is evident that Dr. Marshall was favorable to such an undertaking, for in 1778 he writes to Dr. Lettsom: "I have, indeed, had a design highly favorable to discoveries in view—a journey to the Mississippi westward, but have not yet been at leisure to prosecute it."

He had, already, in 1784, taken his first trip in search of seeds and botanical specimens. This was almost immediately after entering the family of his uncle, and consisted in going to Pittsburg with the wagons and returning by the same route. He writes from Bedford to his uncle: "We have been among the pine mountains, where we have seen cucumber trees, rhododendrons, mountain raspberries, and yesterday about Juniata the broad willow-leaved oak and the red-berried elder. In coming along I have seen many strange plants, but may be chiefly varieties of what we have already. However, I shall gather what seed I can of any such or bring the plants." He kept a journal of the trip, which has been preserved. He also speaks of having seen the horse-chestnut and of getting specimens to bring home.

In 1786 Sir Joseph Banks wrote to Humphry Marshall asking for a hundred weight of the fresh roots of the

ginseng, on the curing of which he wished to try some experiments. The procuring of the roots was undertaken by Dr. Marshall. It occupied about twenty days, and necessitated his going into the Alleghanies for them. He returned with about a hundred weight of ginseng roots, and charged for them an English crown a pound.

Dr. Marshall soon began a correspondence with scientific men in Great Britain and Europe on his own account, especially with Dr. Lettsom, of London. In these letters he sends descriptions of new or rare plants that he has found, and occasionally ventures to suggest a name. One of these descriptions (that of the *Talinum teretifolium*) is especially praised by Dr. Darlington, who says that it was written long before the plant was generally known to the botanists or published in the books, and adds that "from diffidence or want of opportunity to publish many of the discoveries, much of the credit really due to Bartram, Marshall, and Muhlenberg, has been ascribed to or appropriated by European botanists."

About this time we find Dr. Marshall in correspondence with Rev. Henry Muhlenberg, of Lancaster, Pa. It was due to the influence of this distingushed botanist that *Marshallia*, a genus of plants of which there are several species in the South, was named in honor of Moses Marshall, as the following correspondence will show. The first letter is from Muhlenberg to Dr. Marshall:

"*Dear Sir:*—I beg leave to inform you that the new edition of the Genera Linnæi is safely arrived. I am happy to see that the editor, my friend, Dr. Schreber, has done what I requested of him. He has given your name

to a hitherto undescribed plant that belongs to the Syngenesia, which he names the Marshallia. Give my best respects to your uncle, Mr. Humphry Marshall, and believe me, with great esteem, sir,

"Your humble servant,

"HENRY MUHLENBERG."

In the collection of the Marshall papers in the possession of Gilbert Cope, I have found the following copy of the reply to this note in the handwriting of Dr. Marshall:

"WEST BRADFORD, April 13, 1792.

"*Reverend Sir*:—I have just received yours of the 9th instant, and am much pleased to hear of the arrival of the Genera Plantarum. I am very sensible of the honor done me, through your request, by Dr. Schreber, and think myself but too undeserving. I shall be pleased in your calling on your intended journey, and hope you will consider my uncle's house as a welcome stage. I am, with all due respect,

"Your much obliged friend,

"MOSES MARSHALL."

I have given this correspondence complete, as, in the list of plants named for Chester County botanists, prepared by Dr. Darlington in 1857, we find the following statement:

"The genus Marshallia was so named in 1791 by Dr. Schreber, in honor of Humphry Marshall, of West Bradford Township."

In another place Dr. Darlington says that the plant was named for Humphry Marshall and his nephew, yet the above correspondence indicates that Moses Marshall alone was recognized by Schreber and Muhlenberg in the transaction.

Dr. Marshall's correspondents appear chiefly to have been Descemet, of Paris; John Reichert, of Belvidere; Grimwood, Hudson, Barrett and Dr. Lettsom, of London; Richard Barnett, of Dublin; Thomas Russell, of Middletown, Connecticut, and Joseph Watson, of Charleston, South Carolina. The last supplied him with many southern plants for shipment abroad. In addition to plants, he shipped other natural objects, as shells, live tortoises, frogs, birds' eggs, etc.

His letters speak of many trips of which the journal has not been preserved. On one of these he went to Pittsburg, then south through Kentucky and Tennessee, then over the mountains into South Carolina to Charleston. From thence he proceeded into the western part of Georgia and returned to Charleston, and thence by water to Philadelphia, and says: "Notwithstanding the great fatigue, danger and expense in traveling, I have in contemplation a second and more extensive route."

We have seen that Humphry Marshall was interested in having the country west of the Mississippi explored in search of plants and other specimens of scientific interest, and that he wrote to Dr. Franklin and to Sir Joseph Banks, stating that his nephew was willing to undertake such a trip. We also know that for at least fifteen years before the Lewis and Clarke expeditions started for this purpose, that Thomas Jefferson was active in endeavoring to procure a suitable person to lead such an expedition, and to raise the funds to defray his expenses. The following letters from Dr. Caspar Wistar, of Philadelphia, are of much interest in this connection. In a postscript to a letter to Humphry Marshall, dated May 27, 1792, Dr. Wistar inquires: "Has

Dr. Marshall any inclination to explore the country west of the Mississippi? If so, I shall be glad to see him when he comes to town." And on June 20th he writes to Dr. Marshall:

"*Respected Friend*:—By a conversation with thy uncle, I find that thee is already acquainted with the wishes of some gentlemen here to have our continent explored in a western direction. My reason for writing at present is to inform thee of the present state of the business. Mr. Jefferson and several other gentlemen are much interested, and think they can procure a subscription sufficient to insure one thousand guineas as a compensation to any one who undertakes the journey and can bring satisfactory proof of having crossed to the South Sea. They wish the journey to be prosecuted up the Missouri, as the easiest and perhaps the most interesting track. * * * If thee has any inclination, I think it would be very proper to come to town immediately and converse with Mr. Jefferson, who seems principally interested. I am confident that no small matter will stop them if thee is disposed to engage in the business. At any rate, shall be glad to hear from thee as soon as possible, and am, with respect for thy uncle and thyself,

"Thy assured friend,

"CASPAR WISTAR, JR."

James Monaghan suggests that this letter indicates that Dr. Wistar, at least, considered Dr. Marshall a suitable person to lead the expedition, which afterward became known to history as that of Lewis and Clarke, and there seems to be no doubt that this was the case. In 1803 the expedition under Lewis and Clarke set out, and proceeded

by the same route up the Missouri, as was suggested in Dr. Wistar's letter.

His attention was diverted from botany by his appointment to be Justice of the Peace, in 1796. The list of cases tried before him and of the marriages at which he officiated, have been preserved, and show the business of the office to have been considerable. He held this office until his death. That he did not at once discontinue the business of shipping seeds is shown by a letter to Thomas Russell, of Middletown, Conn., in 1797: "I may observe that the present convulsed state of European affairs, with the uncertainty of safe transportation, has given a considerable check to business of this kind. However, a few plants of the following kinds may be procured. The average price of a general collection may be about ten cents per root."

Humphry Marshall died in 1801, and on his death a considerable part of his farm west of the Brandywine passed into the hands of Dr. Marshall. He made use of the water-power in the Brandywine, and erected a stone mill and dwelling house. The house is still standing. The mill was burned a few years ago. The village of Northbrook, which was formerly known as Marshall's Mill, stands on land once owned by Dr. Marshall, and much is still owned by his grandson, Dr. Edward Marshall.

After Humphry Marshall's death his nephew seems to have discontinued his former business, as well as his scientific work. I have not been able to find any records of this period, except some accounts which refer to his milling business, and are of no particular interest to us. He was married about 1797 to Alice Pennock. They had six children, who have left a numerous progeny, most of whom live in Chester County. He died in 1813.

CASPAR WISTAR, M. D.

Caspar Wistar, M. D.,* a skillful physician, and learned professor in the University of Pennsylvania, President of the American Philosophical Society, was born in 1760. He died on the 22nd of January, 1818. In the same year a genus of leguminous plants, *Wistaria*, was dedicated to his memory by Mr. Nuttall.†

BENJAMIN SMITH BARTON.

Benjamin Smith Barton,‡ one of the younger children of the the Rev. Thomas Barton, an Episcopal clergyman, was born at Lancaster, Pa., February 10, 1776. His mother, being a sister of David Rittenhouse, the astronomer, he received a double inheritance of intellectual ability, but the benefits of parental care and training were lost to him at an early age. His mother died when he was eight years old, and his father died when he was fourteen.

Mr. Barton, before his death, intending to go to Europe, had placed his younger children in the care of a friend in the country, where they remained until after their father's death. During this period the young boy devoted much of his time to reading, having a fondness for civil history. His interest in natural history, especially in botany, appeared early, and very likely had received some encouragement from his father, who is known to have been a student of nature.

* For sketch and life see 1849. DARLINGTON—*Memorials of Bartram and Marshall*, 568. Also *The Gardener's Monthly*, (Meehan) II: 360. An oil painting of Dr. Wistar is found in the College of Physicians, 13th and Locust Streets, Philadelphia, presented by Mrs. Mifflin Wistar. Also one at the American Philosophical Society.

† For a discussion as to whether the spelling should be Wisteria, or Wistaria, see *Meehan's Monthly*, VIII: 47, iii.

‡ *Popular Science Monthly*, April, 1896. The main facts given in this sketch are derived from that journal. The portrait reproduced in that journal, p. 167, is from an engraving in his biography, by W. P. C. Barton. A portrait is also to be found in the Academy of Natural Sciences.

In 1780 Benjamin, with one of his brothers, was placed in an academy at York, Pa., where he remained nearly two years, pursuing a classical course. His elder brother, who was living in Philadelphia, took him into his family when he was sixteen years of age, where he remained about four years. During this time he attended, for a short period, the College of Philadelphia, and afterward took up the study of medicine under Dr. William Shippen.

In the summer of 1785 he accompanied the commission, of which his uncle, Mr. Rittenhouse, was a member, in marking the western boundary line of Pennsylvania. Young Barton was absent from Philadelphia five months, and it was on this expedition that he made acquaintance with the Indians, and began his study of their medicines and pathology, their customs and history, which interested him for the rest of his life.

Young Barton, in order to obtain a thorough medical training, went to Edinburgh in the autumn of 1786, where he studied for two years, with the exception of a few months spent in London. Having become a member of the Royal Medical Society at Edinburgh, he was given the Harveian prize of that association for a thesis on the *Hyoscyamus niger* of Linnæus. Barton's first book was published in 1787. It was a booklet entitled, "Observations on some Parts of Natural History: to which is prefixed an Account of some Considerable Vestiges of an Ancient Date, which have been discovered in Different Parts of North America."

Later he left Edinburgh, and took his degree at Göttingen, returning to America toward the close of the year 1789. He began to practice in Philadelphia, where his knowledge of medical science soon caused him to be looked upon as one of the rising young men of the day.

The trustees of the College of Philadelphia, in establishing a professorship of natural history and botany, elected Dr. Barton, then only twenty-four years of age, to the chair. This election was confirmed in the following year, when the College became a part of the University of Pennsylvania. The chair of materia medica in the University became vacant, and this professorship was assigned to Dr. Barton five years later, and was held by him until he succeeded to that of Dr. Rush. He became, in 1798, one of the physicians of the Pennsylvania Hospital, which place he held for the rest of his life.

Among the first works published by Dr. Barton was a memoir concerning the Fascinating Faculty which has been ascribed to the Rattlesnake and other North American Serpents, published in 1796. A supplement to this memoir was printed four years later, and a new edition in 1814. He issued a work on the materia medica of the United States, in two parts, published in 1798 and 1804 respectively,* and an edition of the two combined in 1810. His most important work was his "Elements of Botany," which first appeared in two volumes in 1803. A second edition of the first volume was issued in 1812, and of the second volume in 1814, with forty plates.† Dr. William P. C. Barton issued, after the author's death in 1836, a revised edition in one volume, prefixing a biographical sketch, prepared at the request of the Philadelphia Medical Society, of which his uncle had been president. A translation of the Elements appeared in Russian. Dr. Barton also wrote extensively on other subjects

* *Collections for an essay towards a materia medica of the United States.* Two parts. Philadelphia. Part I: 1798, pp. 19. Part II: 1804, pp. 53.

† *Elements of Botany; or, Outlines of the Natural History of Vegetables.* Ed. I: Philadelphia, 1803. Ed. II: 1812, pp. xviii, 324 ind.—1814, iv, pp. 180, 44; 40 tab.

besides botany. General natural history and archæology also came in for a share of his attention. His literary work made him an indefatigable student, and led him to undertake several ambitious projects which were left unfinished by him.

Only three days before his death he wrote a paper on a genus of plants which had been named in honor of him, and requested his nephew, Dr. W. P. C. Barton, to make a drawing to accompany it. The latter read the paper illustrated by him at the next meeting of the American Philosophical Society. Dr. Barton was elected to this Society, January 16, 1789, before his return from student-life abroad, and acted as one of its vice-presidents, beginning with January 1, 1802.

Dr. Barton was a patron of botanical science. Frederick Pursh, in his *Flora Americæ Septentrionalis* (London, 1814), describes an excursion that he was enabled to take by the aid of Prof. Barton in the beginning of 1805. Pursh, in his exploration, traveled through the mountains of Virginia and the Carolinas, and returned along the coast, reaching Philadelphia late in the autumn. Similar help was extended to Thomas Nuttall, "whose zeal and services," to use the words of Dr. Barton, "have contributed essentially to extend our knowledge of the northwestern and western flora of North America, and to whom the work of Frederick Pursh is under infinite obligations."

Dr. Barton further speaks of Nuttall in the following words:

"I became acquainted with this young Englishman in Philadelphia several years ago, and observing in him an ardent attachment to and some knowledge of botany, I

omitted no opportunity of fostering his zeal, and of endeavoring to extend his knowledge. He had constant access to my house, and the benefit of my botanical books. In 1810 I proposed to Mr. Nuttall the undertaking of an expedition, entirely at my own expense and under my immediate direction, to explore the botany, etc., of the northern and northwestern parts of the United States and the adjoining British territories." Nuttall set out on his journey in April, 1810, ascending the Missouri with other travelers, whose objects were principally traffic. Returning, he reached St. Louis in the autumn of 1811. In the latter end of the year 1811, Nuttall returned to England from New Orleans. Previously to his departure he transmitted to Dr. Barton a number of the dried specimens and seeds which he had collected.

Dr. Barton had been from early life subject to hemorrhages. In a few years increasing ill-health decided him to try a sea voyage. He accordingly sailed for France in the spring of 1815, and returned in November of that year, but without being much benefited. His condition became rapidly worse after he landed, and on the morning of December 19, 1815, he was found dead in bed.

In 1797 Dr. Barton married a daughter of Mr. Edward Pennington, of Philadelphia, who, with their only children, a son and a daughter, survived him. He named his son after Mr. Thomas Pennant, an English naturalist with whom he became acquainted while a medical student.

"In figure [Dr. Barton] was tall and exceedingly well formed; in middle life he might be considered as having been handsome. His physiognomy was strongly expressive of intelligence, and his eye was remarkably fine and penetrating.

"In temperament he was irritable and even choleric. His spirits were irregular, his manners consequently variable, impetuous, vehement. These repeated vacillations between equanimity and depression were generally owing to the sudden and repeated attacks of his continual earthly companion—irregular gout.

"In familiar conversation he was often eloquent, remarkably facetious, but never witty.

"As a parent he was kind, tender and indulgent to a fault."

Dr. Barton corresponded with many prominent naturalists and physicians at home and abroad. He established an enviable foreign reputation, and was elected a member of the Imperial Society of Naturalists of Moscow, the Danish Royal Society of Sciences, the Danish Medical Society, the Linnæan Society of London, and the Society of Antiquaries of Scotland.

FREDERICK PURSH.

Frederick Pursh was born at Tobolsk, in Siberia, in 1774, of German parentage.* He was educated in Dresden, and came to this country in 1799, establishing himself in Philadelphia. He was able to make the acquaintance not only of Muhlenberg, who survived until 1815, and of Wm. Bartram, who died in 1823, but also of the veteran Humphry Marshall, who died in 1805. He says:

"Not far from the latter place are also the extensive gardens of William Hamilton, Esq., called the Woodlands,†

*The main facts for this sketch are taken from an article in *The Botanical Gazette*, VII, p. 141.

†Now occupied as a cemetery, and adjoining the Botanic Garden of the University of Pennsylvania. Woodlands is still good botanizing ground. There grow these several noteworthy plants: *Zelkova crenata;* a noble staminate tree of *Ginkgò biloba; Magnolia grandiflora; Zanthoxylum americanum*, etc. An oil painting of Woodlands is to be found at the Pennsylvania Historical Society.

which I found not only rich in plants from all parts of the world, but particularly so in rare and new American species. Philadelphia being a central situation, and extremely well calculated for the cultivation of plants from all the other parts of North America, I found this collection particularly valuable for furnishing me with a general knowledge of the plants of that country preparatory to more extensive travels into the interior, for the discovery of new and unknown species. Mr. John Lyon (of whom I shall have an opportunity to speak hereafter), who had the management of these gardens, was then about to give them up: having the offer of being appointed his successor I embraced it, and accordingly in 1802, I entered upon the situation. During my stay in this place, which was until 1805, I received and collected plants from all parts of North America; and when Michaux's 'Flora Boreali-Americana' appeared, which was during that time, I was not only in possession of most of his plants, but had then a considerable number not described by him."

His early and principal patron was Dr. Benjamin Smith Barton, who supplied the means for most of the travels which he was able to undertake, and who, as Pursh states, "for some time previous had been collecting materials for an American Flora." Pursh's personal explorations were not extensive. In the spring of 1805 he set out for the mountains and western territories of the Southern states, beginning at Maryland and extending to the Carolinas (in which tract the interesting high mountains of Virginia and Carolina took my particular attention), returning late in the autumn through the lower countries along the sea-coast to Philadelphia.

But, in tracing his steps by his collections and by other indications, it appears he did not reach the western borders of Virginia, nor cross its southern boundaries into the mountains of North Carolina. The peaks of Otter and Salt Pond Mountain (now Mountain Lake), were the highest elevations which he attained. The following season he went, in like manner, over the Northern states, beginning with the mountains of Pennsylvania, and extending to those in New Hampshire (in which tract he traversed the extensive and highly interesting country, of the lesser and greater lakes) and returning, as before, by the sea-coast.

The diary* of this expedition, found among Dr. Barton's papers and collections in possession of the American Philosophical Society, was printed by Thomas Potts James. It shows that the journey was not as extended, or as thorough, as would be supposed; that it was from Philadelphia directly north to the Pocono Mountains, thence to Onondaga, and to Oswego—the only point on the Great Lakes reached—thence back to Utica, down the Mohawk Valley to Saratoga, and north to the upper part of Lake Champlain and to the lesser green mountains in the vicinity of Rutland, but not beyond. Discouraged by the lateness of the season, and disheartened, as he had all along been, by the failure and insufficiency of remittances from his patron, Pursh turned back from Rutland on the 22d of September, reached New York on the 1st of October, and Philadelphia on the 5th. The next year (1807) Pursh took charge of the botanic garden, which Dr. Hosack had formed at New York and afterward sold to the State, which

* *Journal of a Botanical Excursion in the Northern Parts of the States of Pennsylvania and New York, during the year 1807.* Philadelphia, 1869. Edited by Thomas P. James. Also see *The Gardener's Monthly* (Meehan), X and XI.

soon made it over to Columbia College. In 1810 he made a voyage to the West Indies for the recovery of his health. Returning in the autumn of 1811, he landed at Wiscasset, in Maine, and "had an opportunity of visiting Professor Peck, of Cambridge College, near Boston," and of seeing the alpine plants which Peck had collected on the White Mountains.

The plants collected by Lewis and Clark, on their return from the far West, were studied, described, and figured by Pursh. He inserted the descriptions in his flora, distinguishing them by the words: "*v. s.* in Herb. Lewis." He also studied the collections made by Aloysius Enslen, sent to America by Count Lichtenstein, of Austria, which fitted up a desideratum in his collection, particularly in the plants of Lower Louisiana and Georgia. "*v. s.* in Herb Enslen." At the same time he had frequent opportunities of seeing the herbarium and collection of living plants of Mr. John Lyon, a gentleman, through whose industry and skill, more new and rare American plants have lately been sent into Europe than through any other channel whatever. "*v. s.* in Herb. Lyon."

At the end of 1811, or in 1812, he went to England with his collections and notes; and at the close of 1813, consulting, the while, the herbaria of Clayton, Pallas, Plukenet, Catesby, Morison, Sherard, Walter, and that of Banks.*

The work † was completed with expedition. It contains 470 genera of Phænogamous and Filicoid plants, and

* See the introduction to this book p. 26 for account of the discovery and redescription of the Lewis and Clark plants described by Pursh.

† *Flora America Septentrionalis; or, a Systematic Arrangement and Description of the Plants of North America.* 1814. II vols. octavo, pp. xxxvi, 751, 24 tab. col. Second edition, 1816, octavo pp. xxxvi, 751, 24 tab. col. (same impression.)

3076 species; double the number of species contained in Michaux's Flora. In the supplement, Pursh was able to include a considerable number of species, collected by Bradbury on the Upper Missouri, much to the discontent of Nuttall, who was in that region at the same time, and who, indeed, partly and imperfectly anticipated Pursh in certain cases, through the publication, by the Frazers, of a catalogue of the plants collected by Nuttall.

Pursh returned to America, settling in Canada, intending to continue his studies of the North American Flora, but he died at Montreal June 11, 1820, aged 46 years.*

BERNARD M'MAHON.

Bernard M'Mahon† was born in Ireland circa 1775, of good birth and fortune. He was obliged to leave Ireland on account of his connection with one of the unsuccessful rebellions, arriving in America in 1796. He settled in Philadelphia, where, in 1809, he founded a botanic garden, which he named Upsal, partly situated on ground near the yards of the Philadelphia and Reading Railroad at Huntingdon Station, Philadelphia.‡ M'Mahon was one of the first successful gardeners of the United States, and was a man of education, and devoted to his profession. He enjoyed the friendship of Jefferson and other distinguished Americans, and it is supposed that the arrangement for

---

*His grave in the cemetery at Montreal was marked by admiring scientists *The Gardener's Monthly* (Meehan's), XXVI, p. 318.

† See Appleton's Cyclopedia of American Biography (1888).
SARGENT—*Silva of North America*, VII: 86.

‡ His grand-daughter informed Dr. G. B. Keen, librarian Pennsylvania Historical Society, that the garden was located at the junction of Germantown Road and Township line, being now incorporated in Fotterall Square, at 11th and Cumberland Streets.

the Lewis and Clark expedition was made at his house. M'Mahon was the author of "The American Gardener's Calendar," published in 1806, a second edition in 1819, and an eleventh, revised by John Jay Smith, in 1857. *Mahonia*, a genus of handsome evergreen shrubs of West North America, was named in his honor by Thomas Nuttall.

M'Mahon's Garden was founded in 1811, about three miles north of Philadelphia (in the neighborhood of 11th and Cumberland Streets). The committee appointed by the Pennsylvania Historical Society visited the garden in 1830, kept by Mrs. M'Mahon, after the death of her husband, the founder, and reported the collection good.

"Here is the largest Portlandia that we have seen, and a good selection of the succulent family, with many oranges, lemons, shaddock, etc., and splendid magnolias; the macrophylla, grandiflora, etc. A very large tree of Maclura aurantiaca or osage orange; a highly ornamental tree, with bright green foliage, and standing longer in the fall than any other of the deciduous tribe. It bears a large green fruit, not unlike an orange. We think that Mr. M'Mahon was the first to introduce this tree, brought back by Lewis and Clark. Here we saw an uncommon large shrub of the Lonicera tartarica, or tartarian honeysuckle; it is twenty feet in diameter, and high in proportion.

"The ground contains about twenty acres, distributed in nursery stock, and growing vegetable seeds.

"Those two beautiful shrubs, the Symphoricarpos racemosus and Ribes aureum, were propagated in this nursery before any other in our vicinity; and this was the case, too, with many other shrubs and trees. Of European trees there are several valuable specimens, such as Fraxi-

nus, Tilia, Ulmus, Fagus, Betula, Carpinus, Platanus and Pinus. On these grounds are ponds well stocked with beautiful fish and water plants, among these last is the Nymphæa odorata, with its showy white flowers, yellow anthers and sweet fragrance.

"Mr. M'Mahon was an indefatigable arborist, and his garden now exhibits a row of native oaks, planted by him, containing thirty varieties; being all the kinds that he could collect in his day, either with money or zealous exertion. The willow-leaved oak is the most conspicuous, and forms a very handsome conical tree.

"Perhaps we owe as much to the late Mr. M'Mahon, as a horticulturist, as to any individual in America. Besides his efforts in collecting and propogating, we are indebted to him for his excellent book on "American Gardening," which has passed through many editions."*

WILLIAM BALDWIN.

In the south-eastern corner of Pennsylvania, just north of the famed Mason and Dixon line, lies the county of Chester, picturesque, historic and fertile, but specially prolific for a century past in cultivators of botanical science. And in the township of Newlin, in this same county, on the 29th of March, 1779, was born William Baldwin, † the subject of this sketch. His father, Thomas Baldwin, was a member and an approved minister of the Society of Friends. He gave to the son such rudimentary education

*1806. *The American Gardener's Calendar; Adapted to the Climates and Seasons of the United States.* By Bernard M'Mahon, Nursery, Seedsman and Florist, Philadelphia. Printed by B. Graves for the author. Octavo pp., v, 648, index.

†1883. J. H. REDFIELD, *Botanical Gazette*, VIII: 233. An engraving of W. Baldwin appears as frontispiece in DARLINGTON'S *Reliquiæ Baldwinianæ*, from a painting by C. W. Peale on stone, by a Newsam, Philadelphia, 1843.

as the common schools of the vicinity could furnish. But the youth thirsted for knowledge, and soon became a teacher, daily acquiring for himself and imparting to others such store of information as was at his command. While thus engaged, his thoughts were turned to the medical profession, and he became a pupil of Dr. William A. Todd, of Downingtown, in the same county; and afterwards, in the winter of 1802–3, attended his first course of medical lectures at the University of Pennsylvania. Here he formed the acquaintance and secured the intimate friendship of Dr. William Darlington, who, while suffering from a severe attack of illness, received from young Baldwin assiduous kindness and attention, which he never forgot. After his first course of lectures at Philadelphia he resumed his studies with Dr. Todd, at Downingtown, and here he became acquainted with Dr. Moses Marshall, nephew of Humphry Marshall, the well-known author of "Arbustum Americanum," and founder of a botanic garden at Marshallton. The nephew also had some botanical knowledge, and had been of material service to his uncle, both in the establishment of his garden, and in the preparation of his work on "American Forest Trees and Shrubs." Dr. Marshall seems to have first awakened Baldwin's taste for the study of the vegetable creation; and the rich collection of indigenous plants in the Marshallton garden served to strengthen this taste, which soon deepened into zeal under the instruction of Dr. Benjamin Smith Barton, of Philadelphia.

In 1805 Baldwin received the appointment of surgeon on a merchant ship bound to Canton. Returning from China in 1806, he resumed the medical course at the University of Pennsylvania, and on the 10th of April, 1807, he received the degree of M. D. He selected Wilmington,

Delaware, for the practice of his profession, and soon afterward was married to Miss Hannah M. Webster, of that city, a lady of superior intellectual endowments, and favored with a finished classical education, unusual for that day. At Wilmington he devoted his leisure to the study of the plants of that vicinity, and while there in 1811 he attracted the attention of Dr. Muhlenberg, of Lancaster, who sought a correspondence with him, which was actively maintained until Muhlenberg's death in 1815. Dr. Darlington in his *Reliquiæ Baldwinianæ* has given this correspondence to the world, and the letters on both sides, ninety in all, are characteristic of the respective writers, and illustrative of the formative period of American botany.

Pulmonary weakness forced Dr. Baldwin, in the autumn of 1811, to resort to a milder climate, and he removed to the state of Georgia, residing chiefly at Savannah and St. Mary's. Here was a new and interesting field for botanical research, which he cultivated with great ardor, making long journeys on foot, with knapsack on his back, often entirely alone, penetrating far into the territory of the aborigines, among whom his peaceful principles and gentle bearing secured him a kind reception. In 1812 war with Great Britain interrupted these pursuits, and called into use his professional abilities as a surgeon of a gunboat flotilla stationed at St. Mary's. For two years he ministered to the sick and distressed with no other aid than that of his wife. After the close of the war he was stationed at Savannah, where he was brought into close and friendly communication with Stephen Elliott, author of the "Sketch of the Botany of South Carolina and Georgia."* His correspondence

* 1821-24. ELLIOTT, *A Sketch of the Botany of South Carolina and Georgia*, in two volumes. Charlestown, I: x, 14, 606 pp., 12 tab., II: 1824, viii, 743 pp.

during these years of southern residence shows that notwithstanding the interruptions caused by professional labor, and by war's rude alarms, he lost no opportunity for botanical research, and for the acquisition of new material.

Near the close of 1817 he received an appointment as surgeon of the U. S. frigate "Congress," which was to visit Buenos Ayres and other South American ports.

His knowledge of natural history led to this appointment, and it was accepted with the hope that his failing health might be restored. His ship touched at Rio Janeiro, Montevideo, Buenos Ayres, Maldonado, San Salvador, and Margarita. At all these places he made diligent use of his limited opportunities for collecting, and in the Philadelphia Academy are preserved many of the plants so collected.

From this voyage he returned in July, 1818, rejoining his family at Wilmington. He now bent all his energies to the study of the material collected during his Southern residence, with a view to publication, under the proposed title: "Miscellaneous Sketches of Georgia and East Florida, to which will be added a descriptive catalogue of new plants, with notices of the works of Pursh, Elliott and Nuttall, to which will be added an appendix containing some account of the vegetable productions on the Rio de la Plata, etc." In September he writes Darlington: "I have to inform you that I go on *slowly* and, I hope, the more surely. It will not do to hurry—there has been too much hurrying among our botanists. But you may rely upon it that nothing but death or disease will prevent me from going on steadily. Both interest and knowledge increase as I go along." The Southern *Cyperaceæ* now specially engaged his attention. His letters to Darlington and Collins at this time are full of

critical notes and minute inquiries relative to the species of *Cyperus, Scirpus* and *Rhynchospora*, and he had nearly completed his elaboration of the plants of this order, and was engaged upon the genera *Paspalum* and *Panicum* among the grasses, when he laid aside his work at a new and unexpected call. The government was preparing to send out a new expedition for the exploration of the Upper Missouri, under the command of Major Long, to be accompanied by a corps of naturalists. Baldwin's friends, Darlington and LeConte, successfully urged his appointment as botanist, and prevailed upon him to accept. Hope of prolonging his failing health doubtless influenced his decision. In March, 1819, he made the journey over the mountains to Pittsburg, where he joined his fellow-travelers. A small light-draft steamboat had been constructed for the long river voyage, but repeated delays ensued, and it was not till the 5th of May that the departure took place. From the beginning Baldwin seems to have sad foreboding. On the point of departure he wrote Darlington: "I shall hold out as long as I can. Whether my remains are deposited on the banks of the Missouri, or among my kindred at home, is now a matter of little consequence. For the sake of my family, and the pursuits I am engaged in, I should wish to live a few years longer." In fact, his strength was already failing, and only his enthusiasm and force of will sustained him. The boat proved unsuitable for her work—was leaky, damp, and uncomfortable, requiring constant repairs. A stop was made at Cincinnati for a week, partly for repairs and partly on account of the alarming condition of Dr. Baldwin, who remained on shore with his friend, Dr. Drake, until he rallied. As the boat made her slow way

down the Ohio and up the Mississippi and Missouri, he chafed under the restrictions, both of military rule and of increasing weakness, and in his desire to make the most of the few opportunities allowed him for collecting, he, doubtless, exhausted his little remaining strength. On the 15th July the expedition reached Franklin, Mo., and here Dr. Baldwin was compelled to leave it. He found a hospitable home at the house of John J. Lowry, and there, September 1st, he died in his 41st year. He left a wife and four children, the youngest then an infant. The friend who knew him best said of him: "I have never yet had the happiness to be acquainted with any man of a more amiable and upright character, more faithful in the discharge of his duties, or more zealously devoted to science and the welfare of his fellow-creatures."

Dr. Baldwin's published scientific papers were but two, and these were offered for publication just before starting on his last journey:

1. An account of two North American species of Rottbœllia, discovered on the sea-coast of Georgia. *American Journal Science*, 1st series I, 355, 1819.

2. An account of two North American species of *Cyperus* from Georgia, and of four species of *Kyllingia*, from the Brazilian coast and from the Rio de la Plata. *Trans. American Philosophical Society, Philadelphia*, new series II, 167. Read April 16, 1819.

Fortunately his unpublished memoranda fell into the hands of Dr. Torrey, and though in a crude and fragmentary state, they were used as their author would have wished, as contributions for Dr. Torrey's monograph of the *Cyperaceæ*, and for Dr. Gray's monograph of *Rhynchospora* in

Annals of New York Lyceum of Natural History, vol. III. His herbarium was purchased by his friend, Collins, from whom it went to De Schweinitz, who bequeathed it to the Philadelphia Academy of Natural Sciences.*

SOLOMON WHITE CONRAD.

Solomon White Conrad † was a remarkable man, and all who remember him make this statement without reserve. He was also popular, for his house, as a natural history salon, was a favorite gathering place for all the scientific notables of the city.

A descendant of Thones Kunders, who left Crefeld, Germany, July 24, 1683, and settled at Germantown. His father was John Conrad, a blacksmith, and Solomon was born July 31, 1779. We know nothing positively as as to his early life, but it is probable that he became an apprentice of a printer or bookseller. A strong liking for scientific study was early developed, and the fears of his friends were realized that he would not be successful in business. His partner ruined him financially. The outdoor world was more attractive than the shop on Market Street, as the following quotation‡ from the manuscript journal of a nephew will show: "My father, * * * with Solomon Conrad, would take long walks in search of new specimens. I went with them once on a stroll along the banks of the Schuylkill, when they saw, at the same time, in the shallow bed of the river, a fine lot of mussels. Both rushed to the spot, regardless of the rough stones and

---

*1843. DARLINGTON—Reliquiæ Baldwinianæ; Collins' Correspondence, Library Philadelphia Academy; James' History of Major Long's Expedition, Philadelphia, 1823.

†1895—*Popular Science Monthly*, XLVII: 257, from which the main facts given here are taken.

‡ Quoted in *Popular Science Monthly*.

splashing of the muddy water, the broad tails of their plain coats standing out behind and their arms reaching out in front, eager to secure the prize." Having acquired a wide reputation as a mineralogist and a botanist, the subject of this sketch was elected Professor of Botany in the University of Pennsylvania, March 21, 1829, and delivered, May 1st, his introductory address. In *The Friend*, of May 9th, 1829, the late Robert Vaux, of Philadelphia, gives the following account of the lecture: "With a succinct review of the history of botany, he very happily blended some biographical notices of the distinguished men to whom science owed its origin and illustration. He traced, with great acuteness and perspicuity, the analogy of vegetable and animal life, admitting the limit of human knowledge. Every view that he furnished of the subject, upon which he is so well qualified to impart instruction, was just and forcible, while the simplicity of his manner and chasteness of his style were, by no means, the least interesting traits of the lecturer." Frederick Fraley, Esq., of Philadelphia, recently informed Dr. C. C. Abbot, who is related to the Conrad family, that he attended the lecture referred to, and that Mr. Vaux had not overdrawn his account. He evidently died while occupying the chair of botany in the University, for we find his name in the catalogue for 1831, his death occurring October 2, 1831.

Bibliography.

1. "Remarks on the Osmunda Claytoniana of Linnæus"—*Journal Academy Natural Sciences*, VI: 39.

2. "Description of a new species of Juncus"—*Journal Academy Natural Sciences*, VI: 105.

3. "Notice of a new species of Corallorhiza"—*Journal Academy Natural Sciences*, VI: 145.

LEWIS DAVID DE SCHWEINITZ.*

Lewis David de Schweinitz was born at Bethlehem Pa., February 13, 1780.† His father is said to have belonged to an ancient and distinguished family of Silesia, Germany. He was superintendent of the "fiscal and secular concerns" of the Moravian Brethren of North America. De Schweinitz was, doubtless, much influenced in determining his choice of vocation by his father, but still more by his maternal ancestors. His mother was Dorothea Elizabeth de Watteville, daughter of Baron (afterwards Bishop) John de Watteville and Benija,* who was a daughter of Count Zinzendorf. Nicolas Lewis, Count Zinzendorf (born in Dresden in 1700), was celebrated, in his early youth, for forming religious societies. He was afterwards associated with Watteville in founding the system of the "Unitas Fratrum." He established the village of Herrnhut, and from this little colony many missionaries were sent out to all parts of the world to instruct the heathen. At Germantown, and other places near, he held frequent religious discourses in 1742, and in Philadelphia, in a Latin speech, renounced his title of Count, resuming his original family name, and was afterwards known among the Quakers as "Friend Lewis!" Under his immediate agency the colony of Bethlehem was founded. He died at Herrnhut, in 1760. Such a distinguished example, "the ancestor of his family and the

* This name appears in two forms. In the memoir of his life cited below, and in Johnson's Encyclopædia, etc., also in the introduction to this book (pages 4, 9, 24,) it is written according to the German form, L. D. von Schweinitz. In his books, which are all in Latin or in English, it is invariably written L. D. de Schweinitz, (sometimes, L. D. de Schweiniz). His descendants write De Schweinitz, and hereafter in this book that form will be used. Benija, also written Benigna.

† Journal of Mycology, II: 31. This sketch is based on a Memoir read by R. Walter Johnson, May 12, 1835, before the Academy of Natural Sciences, Philadelphia.

1835. *A Memoir of the late Lewis David von Schweinitz P. D., with a sketch of His Scientific Labours, read before the Academy of Natural Sciences of Philadelphia, May 12, 1835*, by Walter R. Johnson. Octavo pp. 38 (with tabular view of the botanical works of Mr. de Schweinitz).

father of his denomination," deeply impressed the imagination of De Schweinitz, who very early conceived the laudable desire of entering upon a career of similar activity. This was the initiative step towards literary and scientific acquisitions.

He was placed, in 1787, in the institution of the Moravian community at Nazareth. Here he remained for eleven years, and during this time, was a pupil most industrious, observant and successful. It was at Nazareth, though before he was a pupil in the institution, that he refers his first impulse to the study of botany. He visited the place in company with his grandfather, Bishop de Watteville, and noticed on the table in one of the rooms of the school, a lichen whose name and characters were commented upon; and from this time forward he was a most enthusiastic student of the vegetable kingdom. One of the teachers at Nazareth gave him instruction in botany, and while he was a student at the place he prepared "A Partial Flora of Nazareth," which is still among his unpublished manuscripts. He made such progress in his studies, and his deportment also was such as to secure his appointment as instructor to some of the classes while he was yet a student in the institution. In 1798 his father was called to Germany. His family accompanied him, and De Schweinitz was placed in the theological institution at Niesky, in upper Lusatia. He was associated with young men of talent and energy, and his activities were here redoubled. J. B. d'Albertini was professor in the institution—a man of great learning and decision of character. To him De Schweinitz was drawn by strong sympathy, and their mutual esteem afterward developed into the closest intimacy. After completing his

L. D. DE SCHWEINITZ.

UNIVERSITY OF ARIZONA
LIBRARY

theological studies, he engaged in teaching in the academy at Niesky. He was all this time not only a diligent student of fungi, but scarcely any topic in the wide field of science escaped his notice. So many interesting and new genera and species of fungi had been found by himself and Albertini, that in 1805 a volume of about 400 pages was published by them conjointly, bearing the following title: "Conspectus Fungorum in Lusatiæ Superioris Agro Niskiensi crescentium e Methodo Persooniana. Cum tabulis xii, aeneis pictis, species novas XCIII sistendibus. Auctoribus J. B. d'Albertini, L. D. de Schweinitz, Lipsiæ, 1805."

De Schweinitz engaged in preaching before he left Niesky, and in 1807 he was called to similar work in the Moravian settlement at Gnadenberg, in Silesia. The following year he was called to Gnadau, in Saxony, and remained there till 1812. At this time he was appointed general agent to his Church in the United States. He married Louiza Amelia Le Doux before leaving, and with his wife was compelled, on account of Napoleon's operations to take a route through Denmark and Sweden, in order to embark for this country. This was advantageous to him on account of extending his acquaintance with men of learning. At Kiel, in Holstein, he became known to many professors of the University; and that institution conveyed upon him the same year, the honorary title of Doctor of Philosophy.

It was a perilous voyage to make at that time, for the United States had declared war against Great Britain. Besides they encountered terrible storms and their vessel was dismasted. They finally reached the shore in safety, and he began his work to appointment at Salem, N. C. In the meantime, "he found time to prosecute the study of botany in a dominion, scientifically speaking, all his own."

The results of his work on the fungi were communicated to the world through the publications of the Society of Naturalists at Leipsic, in 1818. His friend, Dr. D. F. Schwaegrichen, attended to the publication, and the title it bore is as follows: "Synopsis Fungorum Carolinæ Superioris Secundum Observationes" Ludovici Davidis de Schweinitz.

In this year he was called to a meeting of his brethren at Herrnhut, and on his way there he visited England, France and Holland. At these places he visited learned men, and established correspondences that were of great advantage to him subsequently. Some time after his return in 1821, he published a pamphlet containing descriptions of seventy-eight hepaticæ.* In the same year he sent to *Silliman's Journal* (V, p. 48 (1821) pp. 34), a monograph on the genus *Viola*. At the end of this year he was located in his native village of Bethlehem, Pa., both to continue his church duties, and to take charge of the institution for the education of females.

His herbarium was, in the meantime, rapidly increasing, his correspondence widening, and the value of his work was appreciated; this resulted in his election to several societies of natural history in America and Europe. In 1823 he worked up the botanical collections of Say,† in Long's expedition, though he did this with great reluctance, regretting the absence of Nuttall, who had previously agreed to undertake the task. Near the close of this year

*1821. De Schweinitz, *Specimen Floræ Americæ Septentrionalis Cryptogamicæ, sistens Muscos hepaticos hucusque in America septentrionali observatos*. Raleigh. Octavo, 27 pp.

†1824. *A Catalogue of Plants Collected in the North Western Territory by Mr. Thomas Say, in the year* 1823, *in Major Stephen H. Long Expedition to the Source of St. Peter's River*. Philadelphia. Octavo. Vol. II of the narrative by W. H. Keating, pp. 379-480.

De Schweinitz presented to the Lyceum of Natural History at New York, a paper containing instructions for determining the American species of carex. In 1824 he published in the *American Journal of Science* a short paper on the "Rarer Plants of Easton, Pennsylvania."* In this year, also, his "Monograph of North American Carices" † appeared, but previous to its publication, he had placed it in the hands of Torrey, De Schweinitz having been called for the third time to Europe. He said, on his return, that "the judicious and elaborate amendments he had proposed, and the mass of new and valuable matter he had added, entitled Dr. Torrey to a participation in the authorship of the work."

While he was absent (in 1824) in Europe, his paper, "Descriptions of a Number of New American Species of Sphæria," was published by the Philadelphia Academy of Sciences. He continued his mycological work on his return, having given up the superintendency of the literary institution. He devoted his leisure time to his synopsis of North American fungi ("Synopsis Fungorum in America Borealia Media Digentum"), designed for a European journal, but published in the Transactions of the Philosophical Society at Philadelphia, in 1831. His health, heretofore, very good, now began to fail. The great amount of work and care on account of his official station, and the composition of a dissertation on the affairs of his community deprived him of his usual out-door exercise, depressed his cheerful spirit and fatally undermined his health. A trip to Indiana on church duties seemed to revive him for a

* *List of Rarer Plants Found Near Easton, Pennsylvania*, 2 pp. 8 vo. Silliman's Journal, VIII, p. 267.

† 1824. *A Monograph of the North American Species of the Genus Carex.* Edited by John Torrey. New York. Octavo p. 283-373, 6 tab. Annals of New York Lyceum. I, p. 283.

time. But his strength gradually declined until the 8th of February, 1834, when he died calmly and unconsciously, at the age of fifty-four years.

De Schweinitz was of high stature, erect carriage and robust habit. He had an unusually amiable and attractive disposition, which made him a general favorite with high and low. His conversational powers were of a high order, and contributed much to an ease of intercourse which was an important factor of his usefulness. Humor, anecdote and repartee were always at his command, while the varied and exciting scenes through which he had passed, and the prominent personages with whom he had come in contact furnished him with an inexhaustible fund of interesting reminiscences. Strange to say, considering his German extraction, he was devoid of any appreciation for music. He spoke and wrote English, German, French and Latin, and was also acquainted with Greek.

Among his well-deserved honors was the naming after him of *Schweinitzia odorata* (sweet pinesap), by Stephen Elliott. This is a small plant, found from Maryland southward, and bears a spike of flesh-colored flowers which exhale the odor of violets.

De Schweinitz bequeathed his collection of plants to the Academy of Natural Sciences of Philadelphia. It comprised twenty-three thousand species of phonerogams, and many thousand cryptogams. A large portion of the specimens were from the most remote parts of the world, having been obtained by exchange with American and European explorers. They included the "Baldwin Collection" from Florida, Brazil and La Plata which De Schweinitz had bought, and in which he had found three thousand species not before in his herbarium.

JOHN LYON.

We know little of the early history of John Lyon,* who introduced a number of important species of plants into English gardens (viz.: *Nyssa Ogeche* in 1806.) He was probably the son of William Lyon, of Gillogie, in Forfarshire, Scotland, who was afterward a merchant in London. Lyon came to America toward the close of the last century, for he was placed in charge of the famous gardens at Woodlands, in Philadelphia, the property of William Hamilton, in 1802. He remained in this position until 1805 when Frederick Pursh took charge. In the following year Lyon sent to England a large collection of living plants and seeds, which were sold at auction near London. It is evident he soon returned to America, as he devoted several years to exploring the Carolinas, Georgia and Florida, returning in 1812 to England with another collection of plants. Again Mr. Lyon returned to America, and died before 1818, at Asheville, N. C., where he was buried.

A number of species of *Andromeda* were formed by Thomas Nuttall into the genus *Lyonia*, which commemorates "the name of the late Mr. John Lyon, an indefatigible collector of North American plants, who fell a victim to a dangerous epidemic amidst those savage and romantic mountains which had so often been the theatre of his labors."† It was stated by Rev. Mr. Curtiss to Dr. Asa Gray that a portion of his herbarium and his journal were preserved at Asheville, where he thinks they may still be found.‡

---

*1893. SARGENT, Silva of North America, V : 80.

†NUTTALL, *Genera* I : 266.

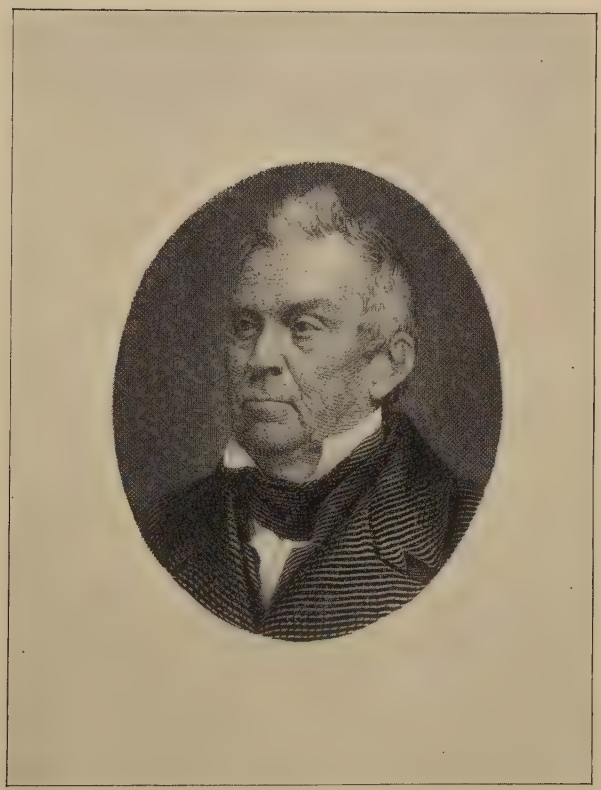
‡ *American Journal of Science and Arts*, XLII : 10. Prof. Thomas Meehan tells me that it is doubtful if the herbarium is preserved, but that the McDowell family possess many things left by Lyon.

WILLIAM DARLINGTON.

William Darlington * was born near the ancient village of Dilworth, now called Dilworthstown, in Birmingham township, Chester County, Pennsylvania, April 28, 1782.

His great grandfather, Abraham Darlington, the son of Job and Mary Darlington, of Darnhall, in Cheshire, England, came, whilst a young man, with his brother, John, to Pennsylvania, in the beginning of the last century, and settled, at first, near Chester. He soon, however, removed to the banks of the Brandywine, about a mile and a half above Chadd's Ford, in Birmingham township, where he remained till his death in 1776. The grandfather of William Darlington, Thomas Darlington, was a farmer, and his son Edward, father of William, was educated a farmer by his maternal grandfather, from whom he received, by will, the farm in Birmingham township, on which he was reared. He married Hannah, a daughter of John Townsend, of East Bradford, Chester County, by whom he had five sons and two daughters. He was an intelligent man, self-educated, and exercised a considerable influence amongst the citizens of his county, by whom he was several times elected a member of the State Legislature. He died in 1825. His eldest son, William, was early inured to the severe labors of agricultural life, and when old enough to drive or hold the plough, was kept at work in the summer, and only permitted to go to school in the winter season. The common schools of that day were lamentably deficient as compared with those of modern times, yet he succeeded in obtaining a plain English education, under John

* *Memorial of William Darlington*, by W. T., printed at West Chester in 1863. Also see *The Gardener's Monthly* (Meehan), V, pp. 157, 168, 182, with portrait.



WILLIAM DARLINGTON.

UNIVERSITY OF ARIZONA
LIBRARY

Forsythe, an Irish friend, one of the best teachers of that time in the county.

Becoming tired and disgusted with the drudgery of farm labor, William, after much difficulty, induced his father to permit him to study medicine. With this view, in the spring of 1800 he entered the office of Dr. John Vaughan, a respectable physician of Wilmington, in the state of Delaware.

Whilst pursuing, with assiduity, the study of that profession which he had selected as the business of his life, he devoted those hours, which many would have given to idle recreation, in acquiring a knowledge of the French language under a private teacher, and there developed a passion for the study of languages, which remained with him for life, and enabled him subsequently to make an excellent and satisfactory acquaintance with the French, Latin, Spanish and German, when opportunity was afforded.

In the winters of 1802–3 and 1803–4, William Darlington attended the medical lectures in the University of Pennsylvania, and on the 6th of June, 1804, he received the degree of Doctor of Medicine. Whilst preparing his thesis, after the close of his second course of medical lectures, Doctor Darlington attended the botanical lectures of Professor Benjamin Smith Barton, and thus began his first acquaintance with that science whose beauties and pleasures he did, in later years, so much to illustrate, and in so successful a manner, as to make his name known and respected throughout the botanical world.

In 1806 Dr. Darlington received the appointment of surgeon to an East India Merchantman, belonging to Philadelphia, and made a voyage to Calcutta, whence he returned

the following year. He availed himself of the leisure afforded him in the long voyage to make an acquaintance with some of the best works then extant in English literature. A sketch of the observations during this voyage was, some years afterwards, published in the form of familiar letters in the *Analectic Magazine.*

In the year succeeding his return from Calcutta, he settled in West Chester, and resumed the practice of medicine, and was soon in the enjoyment of an extensive and profitable business; for on the first of June, 1808, he was married to Catherine, daughter of General John Lacey, of New Jersey, an officer who had served with credit and ability in the Revolutionary War.

Always anxious for self-improvement, Dr. Darlington commenced the German language about that time under a private tutor, and soon made himself sufficiently familiar with it to be enabled to enter into the spirit and enjoy the beauties of the great writers of that tongue.

Feeling as much interest in the subject of general, as well as of self-education, in the year 1811, he was made a trustee and secretary of the West Chester Academy, then about to be built, an institution which gave the first great impulse to popular education in his native county, and which has since sent forth from its walls men who have become distinguished in literature, science and the arts, and who owe their success in life to the knowledge there received.

When the war with England broke out in 1812, the subject of this sketch, with other young men of the neighborhood, offered their services in defence of the altars and firesides of their country in case of invasion. A volunteer company was formed and drilled at West Chester, ready to

serve when called upon, and in September, 1814, on a requisition by the Governor of Pennsylvania for volunteer troops to aid in the protection of Philadelphia, which was supposed to be threatened by the enemy then in Chesapeake Bay, he went to the camp on the banks of the Delaware as an ensign in the "American Grays." Having some taste and skill in military tactics, the regiment into which his company was incorporated chose him major of the first battalion. In this post, he served until the corps was disbanded.

In the meantime, however, his fellow-citizens at home, appreciating his work as a physician, a friend of education, a citizen-soldier, and an enlightened statesman, elected him, unsolicited, a member of the 14th Congress. In 1816, in consequence of dissatisfaction existing toward his colleague in another county (the single district system not having been then adopted), he lost his election by the small majority of seven votes, but this defeat was amply atoned for by triumphant elections to the 16th and 17th Congress, from the same district. During his second term, the celebrated Missouri question agitated the Union, and called forth the ablest efforts of the best men in Congress. On that question Dr. Darlington was found ranked with those who were desirous to restrict slavery, and raised his voice in an able and excellent speech in opposition to its extension. The Congressional district was changed in 1822 in such a manner as to give an overwhelming majority to his political opponents. Defeat, under such circumstances, being certain to the Democratic candidate, Dr. Darlington, under a sense of duty, after the honors conferred by his party, asked and obtained permission to decline a renomination.

The general government, however, was not unmindful of his abilities, and the Secretary of War appointed him visitor to West Point, and acknowledged his services on that occasion and the valuable suggestions in his report, in the warmest manner.

The Commonwealth of Pennsylvania in 1825 was aroused by the booming of the cannon that announced the completion of that great work of internal improvement, projected by De Witt Clinton, and executed by the Empire State, which connected the great lakes with the Atlantic Ocean. She then commenced her own grand scheme of canals and railroads which so much benefited the interior of the State. Dr. Darlington was one of the members of the first board of Canal Commissioners, and was associated with such men as Albert Gallatin, John Sergeant, Robert W. Patterson and David Scott, whose names hold a distinguished place in our country's annals. He served in that station two years, during the last of which he was president of the board.

The duties alluded to, however, though arduous and exacting, did not prevent Dr. Darlington from bestowing some attention to natural science, and indulging his taste for botany. In 1826, in conjunction with some of his intimate friends, he assisted in organizing the Chester County Cabinet of Natural Science, of which institution he was president from its origin; and in the same year he published "Florula Cestrica," being a catalogue of plants growing around the borough of West Chester, Pennsylvania.

The arduous duties of the office of Canal Commissioner, being then performed gratuitously, and calling him away from home more than was either convenient or agreeable, he resigned that office the next year, and was almost

immediately thereafter appointed Prothonotary and Clerk of the Courts of his native county, by his political and personal friend, Governor Shulze, the duties of which office he continued to discharge until 1830. Whilst in the office of Prothonotary, Dr. Darlington, and some of his medical friends, co-operated and formed the Medical Society of Chester County, an institution which has had the good effect of uniting in a fraternal union almost all the physicians of the county. From his long standing in his profession, and the skill which he had acquired by an extensive practice, Dr. Darlington was unanimously placed at the head of the Society, which position he held till 1852, when he resigned and was immediately elected an honorary member.

In 1830 he was elected president of the Bank of Chester County, of which institution he had been one of the commissioners named in the charter. He was re-elected annually, and continued in that station to his death. This bank possessed the entire confidence of the community, and its notes were eagerly sought after in preference to those of other banks within range of its circulation. These happy results were mainly due to the financial abilities of the president and his old and long-tried friend, David Townsend, late cashier of the bank, a gentleman who, it is not improper to state, was associated with Dr. Darlington in nearly all of the public enterprises of a local character in which the latter was engaged. Townsend had the high compliment paid him of having his name conferred upon a new and interesting genus of Rocky Mountain plants, by his friend, Professor Hooker, the learned and talented Director of the Royal Botanical Gardens at Kew, near London.

A similar honor was conferred on Dr. Darlington in 1825, by Professor De Candolle, of Geneva, for his eminent services to botany. The genus dedicated to him by De Candolle did not, however, prove to be sufficiently distinct to maintain its place as an independent genus, and his friend, Professor Torrey, of New York, dedicated to him a new and splendid genus (*Darlingtonia*) of California plants, of the natural order Sarraceniaceæ, which, from its rarity and beauty, constitutes a worthy and fitting compliment to an industrious laborer in the agreeable fields of botanical science. In 1826 Dr. Darlington published a small book, called by him "Florula Cestrica," and later, in the year 1837, published his "Flora Cestrica,"* a description of the flowering plants of Chester County, which was a new edition of his former work, much enlarged and greatly improved. The work is regarded as one of the most complete local Floras extant, and is a model for all works of a similar character. The first addition of the work was arranged according to the Linnæan System of classification, but the Natural System was adopted for the later editions.

Conceiving the idea of assisting the farmers of our country by a work expressly devoted to an account of those plants which it more especially concerns them to know, he prepared and published in 1847 his "Agricultural Botany,"† in which he described in plain and familiar terms not only the useful cultivated plants, but all those which a careful

* 1826—*Florula Cestrica, an essay towards a catalogue of the phœnogamous plants, native and naturalized, growing in the vicinity of the borough of West Chester, in Chester County, Pennsylvania, with brief notices of their properties and uses in medicine, rural economy and the arts.* West Chester, 4 min. pp. xv, 152. 3 tab. col.

1837—*Flora Cestrica, an attempt to enumerate and describe the flowering and filicoid plants of Chester County, in the State of Pennsylvania.* 8 vo., pp. xviii, 640, 1 map. col.

† 1847—*Agricultural Botany, an enumeration of useful plants and weeds.* Philadelphia, 1847, 8 vo., pp. lviii, 270.

and industrious farmer should extirpate from his soil. This work was one of great practical value, and there is good reason to believe that its influence produced a beneficial effect upon husbandry, not only in Chester County, but elsewhere.

The deep interest he always felt in every votary of natural science, together with a strong personal attachment for a friend, induced him at an earlier day (about 1843) to collect together the letters, memoranda, etc., of Dr. William Baldwin, a native of his own county, who also was passionately devoted to botany, but who died at an early age while on the expedition up the Missouri, under Major Long. These remains were given to the world in a volume entitled "Reliquiæ Baldwinianæ." *

The pioneers of botany in Pennsylvania were Humphry Marshall and John Bartram, the former resided near West Chester, the latter near Philadelphia. Dr. Darlington collected, in 1849, such portions of their correspondence as still remained in existence, comprising, together with their own letters, those of many eminent botanists of the day, and published them in one large volume, with illustrations of their homes, under the title of "Memorials of Bartram and Marshall." †

This correspondence of our earlier botanists affords a pleasant insight into their scientific labors, and shows the dangers they underwent and the difficulties they had to encounter in the early settlement of the country, during their expeditions into the wilderness in the prosecution of their favorite science.

* 1843—*Reliquiæ Baldwinianæ.* Philadelphia, Kimber et Sharpless, 8 vo., 346 pp. effigies Baldwini.

† 1849—*Memorials of John Bartram and Humphry Marshall, with notices of their botanical contemporaries.* With illustrations. Philadelphia, 8 vo., 585 pp., 2 tab. and autographs.

Dr. Darlington's later labors in the cause of natural science consisted in a new edition of the "Flora Cestrica," revised and reconstructed on the natural method, which system is now adopted by scientists at the present day. Besides this, in connection with some of the liberal-minded men of his neighborhood, he was engaged in his latter years in the composition of a work descriptive of the Natural History of Chester County in all its branches. He assumed a full share of the necessary labor, his own portion of it having been completed and ready for the press.

Having always been a devoted patriot, Dr. Darlington dedicated a son, Lieutenant B. S. B. Darlington, to his country's cause, as an officer of the Navy, who, after seventeen years of active service, died at Portsmouth, N. H., in 1845, of a disease contracted during the first cruise of our squadron on the coast of Africa. The afflicting loss of his son, Lieutenant Darlington, was soon followed by the death of Mrs. Darlington. Soon after her death he became a member of the Protestant Episcopal Church.

In the spring of 1862 he was attacked by a slight stroke of paralysis, from which he partially recovered, but with some prostration of his physical vigor. This was followed in the early part of 1863 by another attack of the same disease, from the effects of which he gradually sank, until on Thursday, the 23rd of April, 1863, aged nearly 81 years, he passed away with his mental vigor unimpaired.

In order that the people of his county might have the benefit of his materials, Dr. Darlington bequeathed his most valuable herbarium of plants, and all his botanical and most of his other scientific works, to the Chester County

Cabinet of Natural Science,* on whose shelves they are designed to remain as a rich mine, from which the earnest students of nature can glean most precious fruits. He enjoyed, in an eminent degree, the friendship of the best botanists of his day, and his correspondence with the distinguished DeCandolle, and Sir William Jackson Hooker, of the old world, and Drs. Gray and Torrey of the new, attest the high value they placed on his contributions to the science of which he was so fond. It is pleasant to know that those labors have been properly appreciated by men whose commendations are of value, for he received the highly honorable degree of LL. D. from the faculty of Yale College, and was elected a member of more than forty literary and scientific associations, among which may be mentioned the American Philosophical Society, of Philadelphia, and the Botanical Society of the Netherlands, at Leyden.

His mortal remains rest in a quiet and shady spot, selected by himself, in the beautiful Oaklands Cemetery, near those of his friends, the gallant Major Barnard, and the brave young Captain Evans, the patriots and soldiers of former wars, where the hand of affection will cause to be realized his wish inscribed upon the stone above his grave:

"Plantæ Cestrienses
quas
dilexit atque illustravit
Super Tumulum ejus
Semper floreant." †

* See *Botanical Gazette*, V. 90, where Josiah Hoopes states that the collections of Dr. Wm. Darlington and David Townsend are preserved in the Museum of the West Chester State Normal School.

† *Memorial of William Darlington, M. D.*, by W. T. May 21, 1863. West Chester, E. J. James, book and job printer, 1863.

CHARLES J. WISTER.

Charles J. Wister was born in 1782, dying July 23rd, 1865. Elected a member of the American Philosophical Society in 1811, he took a deep interest in its welfare.* He was a friend and contemporary of Thomas Nuttall, with whom he botanized. His son, W. Wynne Wister, was taken by him to hear Mr. Nuttall's lectures in the Germantown Academy, where he received an inspiration for the science which lasted a lifetime.

CONSTANTINE SAMUEL RAFINESQUE [SCHMALTZ].†

Perhaps no American botanist has been so misrepresented and misunderstood as Constantine Samuel Rafinesque. Vain, ambitious and eccentric to the last degree, he was the first teacher of science west of the Appalachians, and one of the pioneer naturalists of the United States. Though a voluminous writer in French, Italian and English, on all kinds of subjects, including religion, ethnology, sociology and natural science, his publications were, in the main, quite limited in the number of copies, and are now mostly rare. In the bibliographical list given in the sumptuous quarto of Dr. Call, nearly 450 titles are quoted of articles, pamphlets and books written by Rafinesque, of which 141 are on botanical subjects. Most of them are rubbish, pure and simple, and yet it must be said that American botany owes him a great deal more than modern systematists generally admit.

* For a short obituary notice, see *The Gardener's Monthly* (Meehan), VII, p. 271.

† *Asa Gray Bulletin*, Vol. IV, No. 1., p. 6. Most of the material for this article, by G. H. Hicks, was obtained from the "The Life and Writings of Rafinesque." No. 10, Filson Club Publications. Richard Ellsworth Call, Louisville, Ky., 1895."

Botanical Gazette VIII: 177, 191. *Garden and Forest*, IV: 146. *Popular Science Monthly*, 1886, p. 212. *Science, N. S.*, I: 384.

Rafinesque was born near Constantinople, October 22, 1783, his father being a French merchant, his mother of German parentage. His early life was spent in various parts of Europe, principally near Marseilles, France, and in Sicily. Though an omnivorous reader, claiming, in his usual exaggerated way, to have read one thousand books before twelve years of age, his schooling was very desultory, owing largely to the roving character of his father, from whom Rafinesque inherited the same disposition. In his earliest childhood he became greatly interested in animals and plants. Frequent walks in the neighborhood of Marseilles gave him opportunity to make observations on natural history. At this time he made a small botanic garden, and also began the study of fishes, birds, shells and crabs, drawing and making notes of many of them. Like Darwin, he could not bear to kill animals, but preferred to study them alive.

At an early age (1802) he emigrated to this country, accepting a clerkship in Philadelphia, but his roving disposition and his desire to study nature precluded the idea of business success. Returning to Sicily he pursued various scientific studies, but in 1815 he concluded to make the United States his permanent home. When off the coast of Long Island the ship on which he sailed foundered, and all of his collections were lost.

In 1818 he made a trip down the Ohio to Kentucky, collecting a great many specimens on the way. At this time he stopped three weeks with Audubon, who was not altogether pleased with the eccentric performances of his guest. For several years Rafinesque was professor of modern languages and natural science in the Transylvania

University at Lexington, Ky. During his term he explored nearly all the accessible portions of Kentucky and many places in Tennessee. As a teacher he was very absent-minded and the butt of many jokes perpetrated by the students. He seemed to shun society, wore ill-fitting clothes, and paid little attention to his personal appearance.

In 1825 he returned to Philadelphia and made collecting trips in nearly all of the middle Atlantic states, also studying the mountain flora of the northern Appalachians. His closing years were passed in the most abject poverty, without friends. He lived in a garret in a house on the south side of Race (Vine ?) Street, near Fourth or Fifth, peculiar on account of the entrance with high steps,* surrounded by his books, minerals, plants, and other scientific collections. Here he died in 1840, and now lies in an obscure grave in Ronaldson's cemetery, at the corner of Ninth and Catharine Streets.

He left a characteristic will, in which he complains bitterly of what he thought to be the ill-treatment given him by American scientists.† His personal effects consisted of eight dray-loads of books and natural history specimens, most of which had been lost or destroyed. A few specimens found their way into the University of Pennsylvania,‡ others are in the Philadelphia Academy of Sciences.

Most of his botanical writings are scattered in newspaper and magazine articles, though he published several more pretentious works, among them being a flora of Louisiana, based entirely on the reports of two non-scientific

* *The Gardeners' Monthly* (Meehan), X, p. 253 (1868).

† See, for account of will, *Garden and Forest*, IV, p. 146.

‡ Mr. Thomas Meehan tells me that the herbarium of Rafinesque came into the possession of Mr. Isaac Burk, who presented it to the University of Pennsylvania, where it ought to be found. Search, however, has so far not revealed it.

travelers. Rafinesque, himself, never saw any of the plants mentioned in this work, but this did not deter him from publishing therein thirty new genera and 196 new species.

This eccentric botanist was a passionate lover of nature and had very lofty scientific ambitions, together with an inordinate desire to see his own name attached to plant binomials. Many of his erratic ways are to be attributed to his desultory early training. He was, however, a keen observer and no mean thinker.* In 1833, twenty-six years before "Darwin's Origin of Species" appeared, Rafinesque had already pointed out the fact of evolution, though at the time nearly all scientists believed in the fixity of species.

He received many honors from various learned societies, and his reputation as a scientist extended throughout Europe. The genus *Rafinesquia* (Nuttall) of the Compositæ, and *Opuntia Rafinesquii*, Engelmann, commemorate his name among plants.

Among the genera founded by Rafinesque, which are universally accepted by American botanists, may be mentioned: *Adlumia, Cladrastis, Cymopterus, Osmorrhiza* (*Washingtonia*), *Lepachys* (*Ratibida*), *Erechtites, Steironema, Ilysanthes, Blephilia, Clintonia, Peltandra* and *Eatonia*. The last edition of "Gray's Manual" recognizes nineteen of his genera, while the recent "Check List" of the Botanical Club of North America, covering the same territory, credits him with forty-seven in all. In Britten and Brown's "Illustrated Flora," fifty of Rafinesque's genera are recognized.

Rafinesque was quicker to discover the relationships and difference among plants than most of his contemporaries.

* A history of the portraits of Rafinesque will be found in Call's "*The Life and Writings of Constantine Samuel Rafinesque*, pp. 64, 67.

His collections in the virgin flora of the Appalachians turned up many new forms. Unfortunately, however, working so much by himself, and with what seems an inordinate zeal to found as many new genera and species as possible, he was particular about neither the source nor the extent of his information, and went into the business of species and genus making in the most wholesale manner.

His descriptions were hastily written and brief, consisting often of mere transcriptions of field notes, and many of them were based on the most unreliable data, hence his work has caused almost infinite trouble among systematists, both in botany and zoology. Had such an opportunity for comparison of plants in different herbaria been afforded him as now exists, he would have escaped a great many errors. In forming an estimate of his work, due allowance should be made for his lack of scientific training, his surroundings, and the crude state of science in his time.

Enumeration of papers * by Rafinesque:

Magazine Articles	144
Books and Pamphlets	39
Rafinesque's Magazines	3
Original Articles in Last	233
Manuscripts	1
Total titles	420

To this summary may be added:

Reprints	17
Translations	7
Books and Oversheets	3
Grand total	447

* For full enumeration and bibliographical details, see Prof. Call's book.

JOHN EATTON LE CONTE.

John Eatton Le Conte* was born near Shrewsbury, New Jersey, February 22, 1784, and died in Philadelphia, November 21, 1860. His residence was partly in New York, where he was educated at Columbia College, partly in Georgia, where his father possessed a large tract of property in Liberty County. His family was of Huguenot descent, his ancestor, William, having left Normandy on the revocation of the Edict of Nantes to join the army of William, afterwards King of England. Thence coming to America he settled in New York, about the year 1692. His son, Peter Le Conte, was a highly esteemed physician in the lower part of New Jersey, and married Valeria, a daughter of John Eatton, of Shrewsbury, among whose numerous descendants may be counted some of our most eminent citizens. From an early age his two sons, John Le Conte and his brother Louis, showed a great love for natural history and the observation of animals and plants. As young men they spent several years in Georgia, where they cultivated their father's plantation and occupied their leisure in the pursuit of science. Here it was that they established a botanical garden, mentioned frequently by the earlier travelers in the United States. This love of nature and the observation of its phenomena has pervaded almost all the members of the Le Conte family. About the year 1817 John Le Conte entered the army of the United States as Captain of Topographical Engineers, and after serving ten years received the customary brevet as Major; but finding his health shattered by exposure during an exploration of the St. John's River in Florida, undertaken

* 1883. A. GRAY.—*Botanical Gazette*, VIII, 197. A painting of Le Conte is in the library of the American Philosophical Society.

in the line of duty, he made a journey to Paris in 1827, where he formed the acquaintance of many of the most eminent men of science there, and with whom he subsequently kept up a correspondence. In 1832 or 1833 he resigned his commission in the army, and lived the retired life of an invalid in New York, until 1852, when he moved to Philadelphia.

His contributions to botanical and zoological science were published mostly in the *Annals of the Lyceum of Natural History of New York*, and in the *Proceedings of the Academy of Natural Sciences of Philadelphia*, from 1852 to 1860. His extensive and valuable herbarium, which had been carefully reviewed by the older botanists of the country, was presented to the Academy of Natural Sciences of Philadelphia in 1852, and was followed shortly after his death by a large collection of fresh water mollusca of the United States, containing many original specimens of species first observed by him.

No separate botanical work bears his name as author, nor any in zoology that we know of, except one on American Lepidoptera, published in connection with M. Boisduval. But the Royal Society's "Catalogue of Scientific Papers" records the title, place and date of publication of thirty-five of them, eleven of which are botanical. Several of these are monographs. The earliest on the "United States Species of Paspalum," was published in the year 1820; three others, namely, those on *Utricularia*, *Gratiola* and *Ruellia*, all in 1824; those on *Tillandsia* and *Viola* in 1826; that on *Pancratium* in 1828. He was a keen but leisurely observer and investigator, and still more leisurely writer. He was a man of very refined and winning manners, of scholarly

habits and wide reading, of an inquiring and original turn of mind, the fruitfulness of which was subdued by chronic invalidism. When he went to Paris he took with him his herbarium, which for that time was unusually rich in plants of Lower Georgia and Florida, and we remember his remark that his botanical acquaintances there made very free use of his permission to help themselves to the duplicates. There is reason to think that the remains of it went to the Philadelphia Academy of Natural Sciences. He is the father of the two Le Contes of the University of California.

THOMAS NUTTALL.

Thomas Nuttall * was born in 1786, in the town of Settle in the West Riding of Yorkshire, England, in humble circumstances. At an early age he was apprenticed to an uncle, a printer by trade, either in his native town or in Liverpool, where he worked as a journeyman for several years, until he went to seek employment in London.

When twenty-two years of age he sailed for America, landing in Philadelphia. He was a studious young man, knowing the history of his country, familiar with some branches of natural history and even with Latin and Greek. It is thus recorded in the biographical sketch of Nuttall, read by Elias Durand † before the American Philosophical Society:

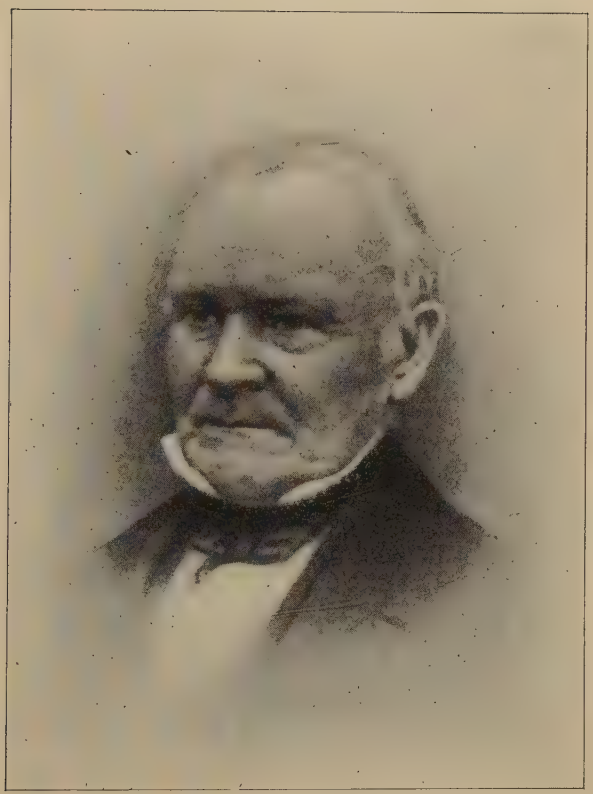
"When, in 1824, Professor Torrey was preparing for publication his 'Flora of the Northern and Middle States,'

* *Popular Science Monthly*, XLVI (1895), 689, from which the main facts are gleaned. See also *The Gardener's Monthly* (Meehan), IV, p. 21, for biography to accompany the frontispiece in that journal, drawn on stone by M. S. Parker; L. N. Rosenthal, Lithographer.

† Proc. Amer. Philos. Soc., VII, 125.

which he dedicated to his friend Thomas Nuttall, with high compliments, the printer who was engaged upon it asked the professor who was that Nuttall so frequently referred to in his work, adding that he had once worked with a printer of that name, who spent the greatest part of his time in reading books, and he would not be surprised if he were the same man. Professor Torrey rejoined that his surmise was correct; the printer of former times had proved a most arduous laborer in the field of science, and was now a distinguished botanist and an officer of one of the first scientific institutions of the country."

It seems that Nuttall was ignorant of the tenets of botany when he landed in the United States. He used to tell the following story of himself. Walking in the fields outside of Philadelphia the morning after his arrival, he noticed a common green-brier (*Smilax rotundifolia*). "Egad!" he said, "there is a passion-flower," and he cut some portions of it, which he brought home for study. His friends at the boarding-house could not satisfy him, but referred him to Professor Barton, whose residence was near. With his specimen Nuttall called upon Dr. B. S. Barton, who received him courteously, and explained the difference between the genera *Smilax* and *Passiflora*. Noticing the intelligent interest of the young man, Professor Barton taught him some of the general principles of botany. This lesson made Nuttall a botanist, and Barton became his friend and patron. It was then early spring, and during the next season Nuttall took frequent rambles, eagerly gathering specimens, which he carried to Barton, who showed him how to prepare them for the herbarium. Later, he extended his excursions, going down into the lower part of the peninsula between



THOMAS NUTTALL.

UNIVERSITY OF ARIZONA
LIBRARY

Delaware and Chesapeake Bays, and then to the coasts of Virginia and North Carolina.

About this time he met John Bradbury, a Scotch naturalist, who had come to America to collect objects of natural history. Later, Bradbury, accompanied by Nuttall, left Philadelphia for the far West. Proceeding to St. Louis, they left that city on the last day of December, 1809, crossed the Kansas and Platte Rivers, passed through the Mandan villages, where Lewis and Clark had wintered during 1804–'05, and ascended the Missouri River still higher, returning after a journey full of the greatest fatigues and dangers, well recompensed by materials and information.

Nuttall spent the next eight years in Philadelphia, during the winter months overhauling and studying the collections made by him in summer excursions to various parts of the country east of the Mississippi, from Florida to the Great Lakes. As a close student, naturally reserved, Nuttall's social intercourse was limited. Prof. Barton, Zaccheus Collins, Reuben Haines, M'Mahon, for whom he named his genus *Mahonia*, William Bartram, and Colonel Carr, were almost his only acquaintances. A room was expressly reserved for him in Colonel Carr's house. During this time he prepared the descriptions for his "Genera of the North American Plants." *

The reputation of Mr. Nuttall, as a botanist, principally rests upon this work printed in 1818. Prof. Torrey, in the preface to his *Flora*, declared that the "Genera" of Nuttall had contributed more than any other work to advance the accurate knowledge of the plants of this

* 1818. NUTTALL—*The genera of North American plants, and a catalogue of the species to the year 1817.* Philadelphia, 2 vols., octavo, I: viii, 312 pp. II: 254, 14 pp.

country. Nuttall, turning his early trade to account, set the type for the greater part of the book.

In 1817 Mr. Nuttall, already a Fellow of the Linnæan Society of London, was elected a corresponding member of the Academy of Natural Sciences of Philadelphia, and a member of the American Philosophical Society. One of his earliest papers in the Journal of the Academy being a description of *Collinsia*, a new genus of plants, named in honor of his friend and patron, Zaccheus Collins.

Nuttall wished to visit the Arkansas country, and soon after his "American Plants" was published, Messrs. Correa da Serra,* Z. Collins, William Maclure and John Vaughan, secured the funds necessary for this long journey. Leaving Philadelphia on October 2, 1818, he reached the mouth of the Arkansas River about the middle of January, and Fort Bellepoint on April 24th. He returned with abundant collections.

On returning to Philadelphia early in the spring of 1820, he immediately began the study of his Arkansas collections, preparing an account of his journey into the interior of Arkansas in 1818 and 1819, which he published in the following year. He contributed several memoirs to the *Journal of the Academy of Natural Sciences* (1820–1822), among them being one "On the Serpentine Rocks of Hoboken and the Minerals which they Contain"—for he was a mineralogist as well as botanist. He also lectured on

* Correa da Serra (José Francisco), born at Serpa, Portugal, in 1751. At the time of the reunion of the Academy of Sciences of Lisbon he was made perpetual secretary (1779). After a rather checkered career in France and Portugal, he lived as a refugee in London, where he published a number of important botanical papers. In 1813 he took a voyage to the United States; then was named Ambassador of Portugal to the United States. He died in 1823. See Baillon, *Dictionaire de Botanique*, from which this sketch is taken. A painting of him is in the library of the American Philosophical Society.

botany to classes of young men. As a lecturer Nuttall was not remarkable for eloquence, but he always imparted to his hearers something of his own passion for botany.

Mr. Nuttall was called to Harvard College at the end of 1822. The endowment not being sufficient to support a professor, he was appointed curator of the Botanic Garden, with light duties of instruction, so that the greater part of his time was devoted to study and to the culture of rare plants. In Cambridge, as well as in Philadelphia, he led a retired life.*

Mr. Nuttall became dissatisfied with his position at Cambridge, because he considered that he was vegetating. At this time James Brown, who was probably his only intimate friend at Cambridge, suggested to Nuttall that he write a book on ornithology. He began with great energy, and in 1832 produced his "Manual of the Ornithology of the United States and Canada," in two volumes of about six hundred pages each and illustrated with excellent wood-cuts. While at Cambridge he contributed papers to various scientific journals, and issued a text-book entitled "An Introduction to Systematic and Physiological Botany.†

Mr. Nuttall visited Philadelphia in 1833, with a collection of plants gathered by Captain Wyeth during an overland journey to the Pacific Ocean. Captain Wyeth was about to start on a second expedition, for the Columbia Fishing and Trading Company, and Nuttall wished to accompany him. Not being able to obtain a sufficiently long leave of absence from his duties as Curator of the Botanic Garden at Cambridge, he resigned his position and spent the time before

* See remarks of Mrs. Asa Gray in editing the papers of her husband.

†1827. NUTTALL—*An intr duction to systematic and physiological botany.* Cambridge. Hilliard and Brown, octavo, XII : 360 pp., 12 tab.

his departure in studying Wyeth's collections and his own Arkansas plants.

Nuttall and John K. Townsend, sent out jointly by the American Philosophical Society and the Academy of Natural Sciences, joined Captain Wyeth's party at Independence, Missouri, from which place they started April 28, 1834. The account of the journey is given in Townsend's "Narrative of a Journey across the Rocky Mountains to the Columbia River," etc. On September 3d, they began to descend the Columbia, reaching Fort Vancouver. Here the two naturalists remained for the rest of the autumn exploring the surrounding country. Later, desiring to pass the winter months in a warmer climate, they took passage on a Boston brig for the Sandwich Islands, where they arrived January 5, 1835.

Nuttall remained two months collecting plants and shells, and then, separating from his companion, sailed for California. He spent the spring and summer on the Pacific Coast, then returned to the Sandwich Islands, sailing home on a Boston vessel returning by way of Cape Horn. He arrived home in October, 1835, and lived in Philadelphia, where he studied the rich collections made on his long journey. Two important memoirs, the fruits of the trip across the continent, were published in the *Transactions of the American Philosophical Society.*

"Nuttall was a remarkable-looking man. His head was very large, bald, and bore signs of a vigorous intellect; his forehead was expansive, but his features small, and his gray eyes looked out from under fleshy brows. His complexion was fair, and sometimes very pale from close application to study and lack of exercise. He was above

medium height, his person stout with a slight stoop, and his walk peculiar and mincing, resembling that of an Indian." *

Nuttall returned to England in December, 1841, where he resided for the remaining seventeen years of his life. An uncle who had prospered in business, having no family, left to him an estate called Nutgrove, in the neighborhood of Liverpool. Nuttall, according to the conditions of the bequest, was to reside in England at least nine months of the year. He had been thirty-four years in the United States, so that, although he had visited England in 1811, and in 1822, returning to reside permanently in the land of his birth was a hardship to our much-traveled botanist. He, therefore, hesitated for some time before accepting the new responsibilities, but consideration for his sisters and their families finally induced him to accept the property.

Shortly before leaving the United States, Nuttall wrote a supplement to Michaux's Silva in three volumes.† The work appeared in 1842–1854.

Nuttall returned to America, stopping in Philadelphia during the last three months of 1847 and the first three of 1848, and while here he studied at the Philadelphia Academy the plants brought by Dr. William Gambel, from the Rocky Mountains and Upper California, and prepared a paper on them which was published in the *Journal of the Academy of Natural Sciences.*

* For the anecdotes concerning Mr. Nuttall's peculiar ways, the reader is referred to Elias Durand's account. See also *Popular Science Monthly*, XLVI (1895), p. 689.

† 1842-1854. NUTTALL—*The North American Silva, or a description of the forest trees of the United States, Canada and Nova Scotia, not described in the work of Francois André Michaux, and containing all the forest trees discovered in the Rocky Mountains, the territory of Oregon down to the shores of the Pacific, and into the confines of California, as well as in various parts of the United States, illustrated by 122 finely coloured plates.* Philadelphia. J. Dobson, 3 vols., impr. octavo, XII: 13, 123, 148 pp.; ind. tab. col., 1-121.

His death occurred on September 10, 1859. In opening a case of plants received shortly before from Mr. Booth he overstrained himself, and from that time steadily declined until his death on September 10, 1859. His love of nature was great, and this, joined with untiring industry and great firmness of purpose, had raised him from the position of an unknown artisan to the foremost rank of American men of science. Elias Durand said of him immediately after his death: "No other explorer of the botany of North America has personally made more discoveries; no writer on American plants, except perhaps Prof. Asa Gray, has described more new genera and species." His name is memorialized in a genus of rosaceous plants, *Nuttallia*.

Bibliography.*

1. "Observations on the genus Eriogonum, and the natural order Polygoneæ."—*Journal Academy Natural Sciences*, I : 24, 33.

2. "An account of two new genera of Plants; and of a species of Tillæa, and Limosella, recently discovered on the banks of the Delaware, in the vicinity of Philadelphia."—*Journal Academy Natural Sciences*, I : 111.

3. "Description of Collinsia, a new genus of plants."—*Journal Academy Natural Sciences*, I : 189.

4. "Description of rare plants recently introduced in the gardens of Philadelphia."—*Journal Academy Natural Sciences*, II : 179.

5. "Observations on the genus Oryzopsis."—*Journal Academy Natural Sciences*, III : 125.

6. "Remarks on the species of Corallorhiza indigenous to the United States."—*Journal Academy Natural Sciences*, III : 135.

7. "Description of two genera of the natural order Cruciferæ."—*Journal Academy Natural Sciences*, V : 132.

8. "Observations on a species of Anemone of the section Pulsatilla indigenous to the United States."—*Journal Academy Natural Sciences*, V : 158.

* For complete bibliography see *Popular Science Monthly*.

9. "Plants collected in East Florida."—*Silliman's Journal*, V : 286.

10. "Description of a new species of Sarracenia."—*Trans. American Philosophical Society*, N. S., IV : 49.

11. "Collections towards a Flora of the Territory of Arkansas."—*Trans. American Philosophical Society*, N. S., V : 139.

12. "Descriptions of Plants collected by William Gambel, M. D., in the Rocky Mountains and Upper California."—*Journal Academy Natural Sciences*, N. S., I : 149.

13. "A Manual of the Ornithology of the United States and of Canada. The Water Birds." Boston, 1834, octavo pp. vii, 627.

The same. Second Edition with additions. "The Land Birds." Boston, 1840, pp. viii, 832.

14. "A Journal of Travels into the Arkansa Territory during the year 1819, with occasional Observations on the Manners of the Aborigines." Illustrated by a Map and other engravings. Philadelphia, 1821, pp. xii, 296.

15. "Descriptions of new species and genera of plants in the natural order Compositæ, collected in a tour across the Continent to the Pacific, a residence in Oregon, and a visit to the Sandwich Islands and California, during the years 1834 and 1835."—*Trans. American Philosophical Society*, 1841, N. S., VII : 283–453.

16. "Descriptions and notices of new and rare plants of the natural orders, Lobeliaceæ, Campanulaceæ, Vaccinieæ and Ericaceæ, collected in a journey across the Continent of North America, and during a visit to the Sandwich Islands and Upper California."—*Trans. American Philosophical Society*, N. S., VIII, p. 251–272.

17. "On the Serpentine Rocks of Hoboken, and the Minerals which they contain."—*Silliman's Journal*, IV : 16.

18. "Observations and Geological Remarks on the Minerals of Paterson and the Valley of Sparta, New Jersey."—*Silliman's Journal*, V : 239.

DR. WILLIAM P. C. BARTON.

Dr. William P. C. Barton was born in Philadelphia, November 17, 1786. He was descended from Rev. Thomas Barton, an Episcopal clergyman, who came to America under the patronage of the Penn family, and married in Philadelphia the sister of David Rittenhouse, the celebrated

mathematician and astronomer, and first President of the Philosophical Society. One of his sons, Dr. Benjamin Smith Barton, held the chair of Materia Medica, Natural History and Botany in the University of Pennsylvania. Another son, William Barton, Esq., member of the Bar, was the father of Dr. William P. C. Barton.

Dr. William P. C. Barton received his classical education at Princeton College. He graduated with distinction at an early age and immediately commenced the study of medicine under his uncle, Dr. B. S. Barton, and graduated at the University of Pennsylvania in 1808. The subject of his graduation thesis was deemed worthy of publication.

After graduating Dr. Barton commenced practicing in Philadelphia; he was surgeon at the Pennsylvania Hospital, and shortly afterward, upon the recommendation of the celebrated Dr. Benjamin Rush and Dr. Physick, was appointed surgeon in the Navy. He was for many years on active duty, and distinguished himself, not only by his ability in the treatment of diseases, but by his great skill in the performance of difficult and delicate operations.

During his releases from sea service he was not content to pass his time unemployed, but devoted himself with great professional ardor to the publication of various works, which, at the time, acquired considerable reputation. Among others, his work on "Marine Hospitals" (published in 1814), his "Vegetable Materia Medica," and "Flora of North America," with drawings from nature, made by himself and colored by his wife (published in 1817 and 1818), his translations of a number of treatises were extensively circulated, and gained for their author considerable celebrity.

He was chosen Professor of Botany in the University of Pennsylvania. Dr. S. D. Gross speaks of him as a remarkable man, highly educated, learned in his profession, a graceful lecturer, an able writer, and one of the most accomplished botanists in America. Dr. Gross, during his first summer in Philadelphia, attended Dr. Barton's botanical class, and his botanical excursions along the banks of the Schuylkill, visiting Bartram's conservatories, or rambling about in the open field in search of specimens. In these excursions Dr. Barton was always in his happiest mood. He experienced as great delight in the discovery of a new plant as Audubon did at the sight of an undescribed bird. He was, in fact, a botanical enthusiast.

He gave, for three years, instruction in materia medica in the Jefferson Medical School, founded in 1825 by Dr. McClellan, when he was ordered by the Navy Department to New York, and became Chief of the Bureau of Medicine and Surgery. In this position he was able to serve his country with great advantage and saving to the Treasury, but, unfortunately, with little increase in popularity to himself. He introduced many reforms, corrected and abolished many abuses, secured the warm commendations and approval of the government, but the hearty ill-will and bitter persecution of those whose interests or hopes were disappointed by his fidelity. Unwilling to incur the storm of persecution to which he was thus subjected, he resigned his position as head of the Bureau, but held his post in the navy until his decease, which took place in the City of Philadelphia, February 29, 1856.

He was buried at Laurel Hill Cemetery with military honors. At the time of his death Dr. Barton had been for

some years the senior surgeon on the roll of the navy. He had in early life many personal attractions and accomplishments. He retained, even to advanced age, a great love for music and great conversational powers. His character was a happy combination of qualities which attracted all and repelled none. Of great courage without any bravado, of affability without servility, of true warm-hearted benevolence, his qualities of heart and mind were well calculated to secure lasting friends among the good and true. He married in early life Esther, daughter of Jonathan Dickinson Sergeant, Esq., a member of the Philadelphia Bar, and granddaughter of David Rittenhouse.

Dr. W. P. C. Barton was the author of the following works:

Floræ Philadelphicæ Prodromus, plantarum quæ hactenus exploratæ fuere, quæque in ipso opere ulterius describentur, exhibens enumerationem, or Prodromus of the Flora of Philadelphia, exhibiting a list of all the plants to be described in that work, which have as yet been collected. Philadelphia, Maxwell, 1815. 4. 100 pp.

Some account of a plant used in Lancaster County, Pennsylvania, as a substitute for chocolate, Holcus bicolor Willd. Philadelphia, Palmer, 1816. Octavo, 8 pp.

Vegetable Materia Medica of the United States, or Medical Botany; containing a botanical, general, and medical history of medicinal plants indigenous to the United States. Philadelphia, Carey, 1817–18. 2 vols. 4. I: xv, 273 pp. II: xvi, 243 pp., 50 tab.

Compendium Floræ Philadelphicæ, containing a description of the indigenous and naturalized plants found within a circuit of ten miles around Philadelphia. Philadelphia, Carey, 1818. 2 vols. 8. I: 251 pp. II: 234 pp.; ib. 1824.

A Flora of North America. Illustrated by coloured figures drawn from nature. Philadelphia, Carey & Son. 3 vols. 4. I: 1821, xix, 138 pp., 138 pp., tab. col. 1-36. With portrait of author as frontispiece. II: 1822, x, 107 pp., tab. col. 37-70. III: 1823, vii, 100 pp., tab. col. 71-106.

Outlines of Lectures on Materia Medica and Botany. 2 vols., 12mo, Philadelphia, 1828. I: 246. II: 291.

Syllabus of the Lectures Delivered on Vegetable Materia Medica and Botany in the University of Pennsylvania, Philadelphia. Printed for the use of the classes. J. R. A. Skerrett, 1819.

Letter to the Trustees of the University of Pennsylvania, relative to introducing the Professorship of Botany into the Medical Faculty.

DAVID TOWNSEND.

David Townsend,* son of Samuel and Priscilla Townsend, was born in the village of Pughtown, Pennsylvania, December 13, 1787. He was brought up as a farmer, but in 1810 was appointed a clerk in the office of the Register and Recorder of Chester County; in 1817 was appointed Cashier of the Bank of Chester County, and so continued until 1849, when he was compelled to resign on account of an accidental injury which he received on the head, and which finally caused his death on December 6, 1858. He belonged to the Society of Friends, and commanded the respect of the community to a very large extent. He became interested in the subject of botany in early life, and in 1826 was one of the founders of the Chester County Cabinet of Natural Sciences, and held the office of secretary and treasury in that Society from its origin until his health failed. He was a correspondent of some of the most prominent botanists of the day, among them Sir William J. Hooker, who declared to a friend that the specimens prepared by David Townsend were the handsomest that he had ever seen. In 1833 a genus of plants allied to the Asters was named *Townsendia*, in compliment to David

* This sketch was furnished by Edwin A. Barber, of West Chester, a grandson of Townsend. See for an other account *The Gardeners' Monthly* (Meehan), I: p. 61.

Townsend. Several species of *Townsendia* are known, the first having been collected on the banks of the Saskatchewan, by Dr. Richardson.

When Mr. Townsend resigned from the bank, the directors presented him with a pair of silver pitchers, appropriately inscribed, and surrounded with engraved representations of *Townsendia.**

Mr. Townsend was an ardent horticulturist and greatly interested in the cultivation of fruits and ornamental plants. In the large grounds adjoining his residence he planted many foreign and rare species of plants, some of which still survive. He was an industrious collector, and traveled over the entire county many times in the pursuit of his chosen science. He rendered very efficient assistance to Dr. William Darlington in the preparation of his Flora Cestrica. Mr. Townsend was a member of the little circle of distinguished botanists of his time, which included Dr. Darlington, Joshua Hoopes and others. Among his close friends were the distinguished botanist, W. J. (?) Bromfield, and Dr. Short, of Kentucky.

JOSHUA HOOPES.

Joshua Hoopes was born in Westtown Township, Chester County, Pa., December 2, 1788, the son of Joshua and Hannah (Martin) Hoopes.† In early life he evinced an earnest desire for scientific study, and although the opportunity for instruction at that period was exceedingly limited, he nevertheless devoted all his spare time to

* The only portrait of David Townsend published was from an original steel engraving which appeared on the bank notes of the Chester County National Bank, between 1850 and 1860. It was furnished by Mr. Barber for this book, but the portrait was crowded out for lack of space.

† A sketch furnished by Josiah Hoopes of West Chester, Pa.

original observation and research. He was among the first pupils admitted to Friends' Westtown Boarding-School, and there laid the foundation for his remarkable attainments that were so noticeable in his later years. After teaching in some of the district schools of Delaware County, he opened a popular boarding-school in Downington, Chester County, where he continued until the year 1836 or 1837, when he removed to West Chester, and followed the same pursuit for many years. His death occurred May 11, 1874.

Joshua Hoopes was twice married: first to Mary Garrigues, of Kingsessing, now Philadelphia, by whom he had six children, none of whom, however, outlived him; and second, to Rachel Bassett of Wilmington, Delaware, a lady of rare botanical attainments, and who in every sense of the word proved a help-meet to her devoted husband. Descending from a long line of Quaker ancestors, he was himself a consistent member of the religious Society of Friends, being imbued with the principles of that sect from his earliest years, and was at all times outspoken in his views regarding the evil customs and practices of the world. In fact, he was a living example of the lessons he taught to others, and a fearless champion of the right on all occasions.

As a scientist, he was especially noticeable for his knowledge of botany and astronomy, although well versed in many other branches. He once remarked to the writer, that his love for botany, ornithology and astronomy was about equally divided, but that he had chosen the first as his life-work, as a careful study of the second entailed much suffering to the birds, and his finances were insufficient to procure suitable instruments for prosecuting his investiga-

tions with the third. Joshua Hoopes was one of a botanical triumvirate residing in West Chester, whose reputation was not alone confined to this country. With such associates as Dr. William Darlington and David Townsend, botany received an impetus and a practical helping-hand that served to advance the science with rapid strides.

The subject of this sketch made a specialty of the ligneous flora that came under his notice, leaving in a great measure to his associates the elaboration of other plants. His intimate acquaintance with our trees and shrubs, and the structure of each, was really marvelous, as he rarely erred in his determination of a species, or its proper classification. Indeed, a large portion of the descriptions of trees embraced in "Flora Cestrica," ostensibly the work of Dr. Darlington, were really from the pen of Joshua Hoopes. His memory was good, and even when advanced in years he could not only recall the names of all our trees, but could without hesitation explain the distinctions existing between allied forms. He was remarkably firm in his opinions, when once convinced of their truthfulness, although open to conviction should he be in error.

Professor Buckley honored him with the name of what was at first supposed to be a new genus of Texan trees, but subsequent research developed the fact that the name could not stand, so "*Hoopesia*" was dropped, much to the disappointment of many of his friends who felt that his services to botany should receive some lasting tribute. Dr. Gray, therefore, named a composite species of the Rocky Mountains, *Helenium Hoopesii*.

As a pedestrian, his power of endurance is worthy of notice, as when in pursuit of specimens, his trips of twenty

or more miles were accomplished with apparently little fatigue. Of a slight though rugged physique, aided by perfect health, and a very abstemious life, his favorite walks were undertaken when even beyond the allotted age of three score and ten, and few of his associates possessed sufficient vigor, or cared to accompany him on a long day's tramp.

ABIGAIL KIMBER.

Abigail Kimber, of Kimberton, Pennsylvania, was a friend and correspondent of William Darlington, and her name in acknowledgment of plants found in her neighborhood, occurs in "Flora Cestrica." She was an admirable and inspiring teacher, to use the words of Graceanna Lewis, who was one of her pupils.

JOHN EVANS.

John Evans was born in Radnor Township, Delaware County, on February 13, 1790, and died on the 15th of April, 1862.* He was the son of David and Adah Evans. On the side of his father, his ancestors were thoroughly Welsh, while on that of his mother they were partly so. His mother died in 1800, and his father six years later. John Evan's early education was limited, though he received rather more than was usual at that time in the neighborhood. Though there was a mill on the patrimonial estate, he preferred going to a larger establishment to learn the business of milling, which he had selected for an occupation in life. After he had learned the trade thoroughly, he was employed as manager of a large flour mill, then (1812)

* 1862. GEO. SMITH—*History of Delaware Co.*, 459.

recently erected on the Hudson River, near the present city of Troy. Here he remained three years, much to the satisfaction of his employers.

After his return from Troy he resumed the milling business at the homestead mill, and in 1819 married Ann, the daughter of Benjamin Brown, of Radnor, by whom he had six children.

He subsequently engaged in the business of sawing lumber for the Philadelphia market, which he continued to do until near the close of his life.

Up to about the year 1827 or 1828, though industrious in the acquisition of knowledge, John Evans had not shown a great preference for any particular branch of science. About this time he received a visit from his kinsman, Alan W. Corson, of Plymouth, Montgomery County, who was on his return home, with his daughter, from the Westtown boarding-school. The visitors remained over night, and had with them a copy of Dr. Darlington's "Florula Cestrica," then lately published and used in Westtown School. This was the first knowledge John Evans had of any work descriptive of our local flora. He had then some practical acquaintance with plants and their culture, but it was the opportune visit of his relative Corson, and this early publication of Dr. Darlington, that first opened the way for him to enter upon the study of botany systematically. From this time until the close of his life, the study of botany became with him a primary occupation.

The tastes of his visiting kinsman were congenial with his own. They often visited each other, and frequently made botanical excursions together. What one had acquired was freely communicated to the other, till they both became

JOHN EVANS.

UNIVERSITY OF ARIZONA

familiar with all the plants in the neighborhood, with perhaps the exception of some of the most inconspicuous. The culture of rare plants around his dwelling commenced and progressed with his study of botany. Annual, or more frequent visits were paid to the old Bartram Botanic Garden —then in possession of Colonel Carr—and to other gardens in the vicinity of Philadelphia. The supply from this source was soon exhausted when he turned his attention to Europe, entered into a correspondence with Sir William J. Hooker, Director of the Gardens of Kew, near London, and by forwarding to that learned botanist, annually, for many years, seeds and specimens of American plants, frequently obtained by long journeys and much labor, he received in return, new and often very rare plants from various parts of the world, scarcely obtainable from any other source by purchase. During part of the period occupied by this correspondence, Dr. Hooker, the son of Sir William, made a botanical tour to the Himalaya Mountains, in Asia. Seeds from that almost unexplored region, many of them produced by unknown plants, were forwarded to John Evans. He bestowed a great amount of labor and care upon the propagation of plants from these seeds. Besides Professor Hooker, he for a time had a correspondent in Germany. He also had a number of correspondents in different parts of the United States, but most of his rare American plants were collected by himself during his frequent botanical tours. These tours were generally made to mountainous regions.

The premises of John Evans afforded no suitable grounds for an extensive garden specially designed for show and ornament, and yet it is doubtful whether another

spot of the same extent presented such a great variety of plants. There was a place on these grounds for plants of every habit, and every plant was found in the best place for its propagation and growth. On the densely wooded hill-side, north of the dwelling, were found magnificent rhododendrons, and other mountain shrubbery and herbaceous plants, natives of the Himalayas, the Rocky Mountains, the Adirondacks, the Catskills and the Alleghanies, growing side by side, and mingling their gaudy colors and rich perfumes in deep-shaded seclusion, moistened by the spray from the adjacent cascade of the mill-pond. Below, upon a flat on the opposite side of the creek, was an arenaceous alluvial deposit. Here was found the well-known "sand garden" of the late proprietor, and clustered within it a great number of species from New Jersey, and many strangers from similar soil in more remote regions. The arid rocky hills were covered with pines, and other *Coniferæ* of the rarest species. The damp ravine had its miniature cane-brake; the artificial pond its odoriferous water lilies and other aquatics. Every border was crowded with its appropriate specimen of rare and curious productions of the vegetable kingdom, brought together from remote parts of the earth. Every nook and corner had a fitting tenant, whose right of occupancy no horticulturist could question. In this planting, John Evans observed no order but the order of nature. A large proportion of the labor required for the care and cultivation of this vast collection of plants was performed by the hands of their late owner. But time and labor were economized in every possible way consistent with proper culture. The saw-dust from his mill was used extensively around the growing plants to smother weeds.

EVANS' HOUSE AND GROUNDS IN 1897.

UNIVERSITY OF ARIZONA
LIBRARY

This soon decayed into a rich vegetable mould that promoted the growth of the plant, and soon enabled it to take care of itself.

The extent of the Evans collection is not known. No catalogue of it was ever published. In the number of distinct species of trees and shrubbery, this collection may, without doubt, be set down as unrivalled in John Evans' day, while in herbaceous plants it had very few equals. To many of the rare trees and shrubs, appropriate leaden labels were attached.

With John Bartram and Humphry Marshall, John Evans completed a trio of self-taught American botanists, all born within the limits of old Chester County, and the first and last within the bounds of the present County of Delaware. They were men of like tastes, and were alike in their industrial and frugal habits. They were all men of the strictest integrity and highest moral worth, and especially were they alike as devoted students of the vegetable kingdom. Each reared his own monument in the large collection of growing plants he left behind him.

John Evans lived in an age when botanical knowledge was more readily acquired, and rare specimens of plants more easily collected than in the times of his predecessors. Hence, the vastly greater extent of his collection, while it is so highly creditable to him, is no disparagement to them. But his attention was not confined to plants alone. He had acquired a good knowledge of mineralogy, geology and zoology. On the 27th day of December, 1834, John Evans became a member of the Delaware County Institute of Science, and it is probable that the study of these sciences commenced about that period.

John Evans was eminently a thinking man. He was liberal, almost to a fault, in the distribution of plants among such of his friends as he believed would properly care for them.

The garden, which exists much as the botanist left it, is reached from Rosemont, a station on the Pennsylvania Railroad, by following Robert's Road to the far side of Ithan Creek. The house, rebuilt in 1895-96, is on a hill surrounded by fine trees, which John Evans planted. The mill-race plunges over in front of the house in a small water-fall, which marks the site where the mill stood. The spring-house was torn down, but everything else, with the exception of two trees, stands as in the botanist's day. His daughter married David Paxson, who sold the property to Dr. James M. Harrison, who in turn sold it to William H. Ramsey, the present occupant. Mrs. Paxson now resides in Norristown, Pennsylvania.*

DR. JOHN FOTHERGILL WATERHOUSE.

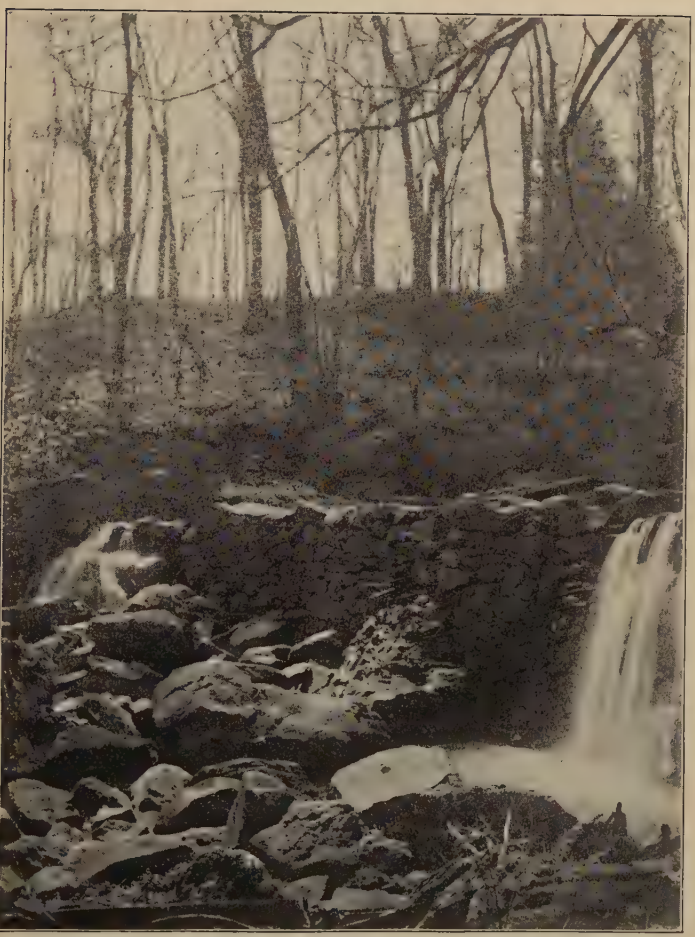
Dr. John Fothergill Waterhouse† was born at Cambridge, Massachusetts, in 1791, and received his classical and the rudiments of his medical education at Harvard University. The pre-eminent reputation of the Medical School of the University of Pennsylvania induced him to complete his medical education in Philadelphia, where he graduated as Doctor of Medicine in the spring of 1813. Upon the completion of his studies, and at the solicitation of his friends, he fixed his permanent residence in his adopted

*See an article of mine—"John Evans and his Garden"—in *Garden and Forest*, X: 182; also Mr. Thomas Meehan's review of this article in the same journal, p. 198.

† *Journal of Academy of Natural Sciences*, I: 33.

WOODS AND ITHAN CREEK, EVANS' GARDEN.

UNIVERSITY OF ARIZONA
LIBRARY



MILL DAM IN EVANS' GARDEN.

UNIVERSITY OF ARIZONA

city, and soon after became a member of the Academy of Natural Sciences.

Under the auspices of the Academy of Natural Sciences he delivered, in conjunction with Dr. Barnes, during the spring of 1814 and the succeeding spring of 1815, two courses of popular lectures on botany. Upwards of two hundred ladies, besides a considerable number of gentlemen, attended the first course, and the audience to the second was still more numerous. He also lectured on comparative osteology and ichthyology. An enthusiastic attachment to natural history, and an anxious solicitude for honorable distinction, prompted him to intellectual exertions, incompatible with his delicate constitution, naturally disposed to pulmonary disease. He availed himself of the mild winter of a southern climate, and accordingly left Philadelphia never to return. He died at Charleston, South Carolina, May 18, 1817, aged twenty-six years.

DANIEL B. SMITH.

Daniel B. Smith was born July 14, 1792. He received his literary education in the school of John Griscom, at Burlington, New Jersey, at that day a somewhat famous seminary. After leaving school, he studied pharmacy with John Biddle, in Philadelphia. Upon acquiring a knowledge of chemistry and practical pharmacy, he was for a while partner of his preceptor, and after his decease, which soon occurred after Daniel B. Smith became of age, entered into partnership with William Hodgson, a man of considerable erudition.

He was one of the founders of the Philadelphia College of Pharmacy, and for twenty-five years its president. He

was one of the three citizens who originated the Apprentices' Library of Philadelphia, in 1820. He was among the incorporators of the old Philadelphia Saving Fund, and the House of Refuge, Philadelphia's great reform school.

Mr. Smith was a sincere and devoted lover of science, and a member of the Academy of Natural Sciences, the American Philosophical Society, the Franklin Institute, and one of the earliest members of the Historical Society of Pennsylvania.

After leaving college he withdrew to private life, and delighted in his favorite studies of botany and conchology, and in his well-stored library in Cottage Row, Germantown, passed many congenial days among his books. He died March 29, 1883, at the ripe age of nearly ninety-one years. For a long time Daniel B. Smith taught at Haverford College, where he left the impress of his character on students and institution alike.*

ELIAS DURAND.

Elias Durand † was born in Mayence, France, June 25 (Janvier?), 1794, and died on the 15th of August, 1873. His education was commenced at the school in his native village, where he began his studies preparatory to pharmacy which he took at Paris in 1812. He served in the medical corps of the first Napoleon and was present at the bloody battles of Lutzen, Bautzen, Hanau, Katsbach and Leipzig. He gathered a specimen of *Menyanthes trifoliata* amid the roar of the cannon at Leipzig, showing his strong botanical

* 1892. GARRETT—*History of Haverford College*, 155; portrait, 63. See also *The Gardener's Monthly* (Meehan), XXV, p. 158 (1883).

† *Actes de la Société Linnéene de Bordeaux*, XXIX, 2e liv., 1873, par M. Charles des Moulins. See also *Bulletin Torrey Botanical Club*, IV: 45. An oil painting of Durand hangs in the library of the Academy of Natural Sciences.

bent even then. At Hanau he was made prisoner. On the final overthrow of Napoleon he came to the United States, landing in New York (Boston?) in July, 1816. Settling first in Baltimore, where he married in 1825, he removed to Philadelphia, a city which he made his home during the remainder of his life. He was by profession a pharmaceutist and chemist, and coming to this country when the science of pharmacy was in its infancy, at once took a high position to which his acquirements entitled him. His store at Sixth and Chestnut Streets, where the Ledger Building now stands, was the centre of attraction to the eminent physicians and men of science of twenty or thirty years ago, where his genial bearing and sympathy with scientific pursuits made all such visitors welcome. He contributed pharmaceutical articles to the *American Journal of Pharmacy* and the *Journal de Pharmacie de Paris*, and he introduced into Philadelphia the use and manufacture of soda water.

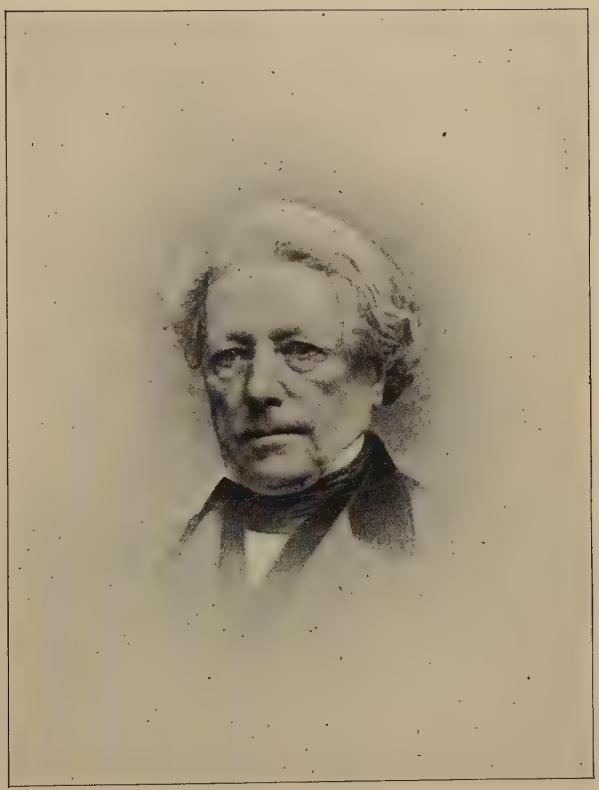
Mr. Durand was an active member of the Academy of Natural Sciences, and was for a long time at the head of its committee on botany. He retired from business with a competence, many years ago, but did not give up his love for botany, as nearly every day found him at the herbarium of the Academy engaged in some useful work.

The manner in which Mr. Durand's attention was directed to the flora of this country is perhaps a bit of history worth recording. An eminent botanist thus relates it: "When Mr. Durand left France for this country, American plants were but little known, and in great demand. Some one gave the young Durand funds with which to purchase him a collection of North American plants. At that time Rafinesque was at the height of his erratic career, and

Durand arranged with him to furnish the required collection. After the bargain was made, Rafinesque, always poor, contrived to get his pay in advance. The time at which the collection was to be delivered had expired, and the day upon which the vessel was to sail was close at hand, and still the plants were not delivered. At last, on the very day of the sailing of the vessel, Rafinesque appeared with his parcels of specimens. Durand had only time for a hasty inspection and found that the bundles consisted of a lot of worthless rubbish. He was highly mortified at being obliged to send his friend, who had already paid a liberal price, such a poor return, and he determined to make amends by making a collection himself. With this view he began to herborize, and in the course of a few years sent to his friend a remittance of plants that was every way satisfactory. Having begun the study in this manner, he formed for it a real love which remained with him through life.

Mr. Durand collected very thoroughly in the neighborhood of Philadelphia, and was the constant friend of all the botanists who visited the city. Although he never said so directly, he no doubt did much to assist Nuttall. Nuttall was, by the way, an eccentric botanist. Although they met so frequently at the Academy and elsewhere, and were, so to speak, botanically intimate, yet Durand never knew how and where Nuttall lived. When Mr. Durand retired from business it was his desire to devote himself to botany, but at that time his eyesight failed him to such a degree as to prevent him from too close application to a study that requires correct observation.

His principal contributions to botanical literature were:



ELIAS DURAND.

UNIVERSITY OF ARIZONA
LIBRARY

"Plantæ Heermannianæ: Descriptions of new plants collected in South California by the Pacific Railroad Survey under Lieutenant R. S. Williamson, U. S. A.," in conjunction with Dr. Hilgard. "Plantæ Prattenianæ Californicæ: An enumeration of a collection of California Plants made in the vicinity of Nevada by Henry Pratten, Esq., of New Harmony." "Plantæ Kaneanæ Grœnlandicae. Enumeration of Plants collected by Dr. E. K. Kane in his first and second expeditions to the Arctic regions." These were published in the *Journal of the Academy of Natural Sciences*, Volume III, 2d ser., 1855–58.* In 1859 he published a "Sketch of the Botany of the Basin of the Great Salt Lake of Utah." This was founded upon a collection made by a lady, Mrs. Carrington, a resident of Salt Lake City, and the plants described in other memoirs were here enumerated so as to present a view of the botany of that region up to the time of the publication. Mr. Durand was also author of a treatise "Sur les Vignes et les Vins des Etats Unis" (*Société d'Acclimation*, IX : 313, 410), and of a Paper, "Monographie Botanique" (*Société d'Acclimation*, IX : 479–486).

Although so long a resident of this country, Mr. Durand remained a thorough Frenchman. It was the pride of his life to have served under l'Empereur. During his career he accumulated an herbarium which, though not remarkably large, was of great value. It probably contained a more complete set of Nuttall's collections than any other, not excepting the herbarium of the Academy. In 1868 he carried out his long-cherished intention of depositing this herbarium in the Paris Musuem, and made a long voyage to France solely for that purpose. In his will he directed

* See introduction to this book, pages 9 and 10.

that the specimens he had accumulated since 1868 should be incorporated with the main collection. His botanical library he directed to be deposited in the herbarium room of the Academy, where it can be available for the working botanists.

Mr. Durand was personally an exceedingly courteous and genial gentleman, who probably did as much for botany by the encouragement he gave others, as by any direct contributions he made himself.

Mr. Durand was one of the curators of the American Philosophical Society and honorary or correspondent member of the College of Pharmacy of Philadelphia, of the Société Pharmaceutique de Paris, American Pharmaceutical Association, Société d'Acclimation de Paris, Société Linèenne de Bordeaux, Academy of Natural Sciences of Buffalo, the Linnæan Society of Lancaster.

EZRA MICHENER.

Ezra Michener, M. D.,* was born November 24, 1794, in London Grove Township, Chester County, Pennsylvania, on a farm successively owned and occupied by four generations. His father, Mordecai, and his mother, Alice (Dunn) Michener, had children Robert, Lydia, Phœbe and Ezra. Ezra studied in his early years under Daniel Hoopes and his successor John Mull, who taught nothing beyond the rudiments of reading, writing, arithmetic with a smattering of book-keeping. Ezra Michener's innate fondness for plants and flowers was intensified by his frequent visits to Harmony Grove, but he had no botanical book to follow; indeed, there does not seem to have been any book on the

* 1893. *Autobiographical Notes from the Life and Letters of Ezra Michener, M. D.* Philadelphia. Friends' Book Association.

subject for beginners either written by an American, or printed in America for several years after. He was furnished with Rees's "New Cyclopædia" in ninety-two half volumes, quarto. This work afforded a rich store of botanical knowledge. The genera were alphabetically arranged with the known species following, but Ezra could seldom stumble on the descriptions of the plants studied. When he did discover them he wrote down the botanical and common names until he had a respectable list. He also made a list of scientific terms, as they came under notice, with definitions.

At the age of twenty-one he went to Philadelphia and lived in the family of Dr. David Jones Davis. In the spring of 1816 he attended the lectures of Dr. William P. C. Barton on botany; but there was still no book suited for beginners. Dr. Barton's "Flora Philadelphicæ" was not published until two years later. In the early summer of 1816 he was appointed house surgeon at the Philadelphia Dispensatory, at a salary of $250 a year.

On April 15, 1819, he married Sarah Spencer, and lived happily until her death, when, in 1844, he married a second time, Mary S. Walton, of London Grove.

Dr. Barton's "Flora Philadelphicæ" was the first real botanical book which Ezra Michener had for study, until Dr. Darlington published his "Florula Cestrica" in 1826. About this time, under the leadership of Dr. William Darlington, was organized the Chester County Cabinet. The object was two-fold; first, to form a collection of the natural productions of the county; and second, to gather materials for its prospective natural history.

Dr. Darlington, being engaged in the preparation of his

little book, "Florula Cestrica," he requested the assistance of Mr. Michener in the work. This gave a fresh impulse to his botanical studies. Dr. Darlington acknowledged his indebtedness to Ezra Michener in the collection and preparation of the lichens for his "Flora Cestrica," referring to him as a naturalist of acumen, diligence and indomitable perseverance. As a botanist, Mr. Michener was much interested in the cryptogams, and did much good work in their collection and study. In 1840 Mr. Michener was elected a correspondent of the Academy of Natural Sciences. He did much active collecting, and was thoroughly conversant with the flora of Chester County. He died a lifelong and active member of the Society of Friends, June 24, 1887, at Toughkenamon, Chester County, Pennsylvania, aged ninety-two years seven months. His coffin was made of the boards from the trunk of a tree, *Paulownia*, which he had planted.

He was a frequent correspondent with many of the most eminent scientists of his time, among whom may be mentioned Darlington, Rothrock, Curtis, Laning, Ravenel and Tuckerman. Agassiz said of him "that he did not belong exclusively to Chester County, Pennsylvania, or America, but to the whole scientific world." *

GEORGE B. WOOD.

George B. Wood † was born in Greenwich, Cumberland County, New Jersey, March 13, 1797. His parents were Friends, and his grandfather, Richard Wood, was a

* His letters are in possession of his son, Ellwood Michener, Toughkenamon, Pennsylvania, who forwarded them to me for inspection.

† *Medical Record*, 1879, pt. I, 335. An oil painting presented by Richard Wood hangs in the library of the College of Physicians, and another one at the American Philosophical Society.

county judge in 1748. The education of Dr. Wood was begun in the City of New York, but was completed at the University of Pennsylvania, where he graduated in the year 1815. Immediately after obtaining the degree of A. B., he entered the office of Dr. Joseph Parrish, of Philadelphia, and took the degree of M. D. in the medical department of the University of Pennsylvania in the year 1818. He delivered in 1820 a course of lectures on chemistry, and in 1822 was appointed to the chair of chemistry in the Philadelphia College of Pharmacy. This position he held until the year 1831, when he was made Professor of Materia Medica in the same college. On the sixth of November, 1835, he was elected to the chair of materia medica and pharmacy in the medical department of the University of Pennsylvania. When Dr. Nathaniel Chapman resigned the chair of theory and practice of medicine in 1850, Dr. Wood was elected to fill his place. In 1860 he resigned this chair and in 1869 was elected a trustee of the University. Dr. Wood was attending physician to the Pennsylvania Hospital from 1835 to 1859. In this latter year he was elected President of the American Philosophical Society, which position, together with that of the presidency of the Philadelphia College of Physicians, he held at the time of his death.

He was married in 1823 to Caroline, daughter of Peter Hahn, a merchant of this city. Their union, from which there were no children, was an exceptionally happy one. It was terminated in 1867 by the death of Mrs. Wood.

His election to the chair of materia medica in the University, in 1835, was productive of new and fresh

interest in that branch. In addition to the creation of an admirable cabinet of drawings and specimens illustrative of the materia medica, Dr. Wood erected a spacious greenhouse, in connection with a garden, and stocked them with many varieties of rare tropical and exotic plants, which he exhibited as illustrations of the subject treated in his lectures.

Dr. Wood was the author of numerous and valuable books, chiefly relating to his profession, which still rank among medical classics. His first important work, the "Dispensatory of the United States," was written in conjunction with Franklin Bache, M. D., and the original edition was published in Philadelphia in 1833. It went through fourteen editions, the last being 1877. In addition to this book he prepared conjointly with Dr. Bache, in 1830, a "Pharmacopœia."

In 1847 he published a "Treatise on the Practice of Medicine." It ran through six editions, the last appearing in 1867. He also published in 1856, a "Treatise on Therapeutics and Pharmacology." He also wrote "The History of the Pennsylvania Hospital," "History of the University of Pennsylvania," "Biographical Memoir of Franklin Bache," etc. In 1872 these sketches, with the addition of the "History of Christianity in India," "History of the British Empire in India," "History of Girard College," and other papers, were collected into a volume, styled, "Memoirs, Essays and Addresses."

In 1865 Dr. Wood endowed an Auxiliary Faculty of Medicine in the University of Pennsylvania, which was composed of five chairs, namely: (1) Zoology and Compara-

tive Anatomy; (2) Botany; (3) Mineralogy and Geology; (4) Hygiene; (5) Medical Jurisprudence and Toxicology. The incumbent of each chair was required to deliver during the months April, May and June not less than thirty-four lectures. Dr. Wood paid each professor $500 annually, and bequeathed a fund of $50,000 from which the payment continued. He also bequeathed to the University his numerous collections, all his medicinal plants, and $5000 to establish a botanical garden and conservatory.

His death occurred at his residence in Philadelphia, March 30, 1879, at the advanced age of eighty-two years, having spent his long life usefully and acceptably in every respect. He was generous, benevolent, charitable in the broadest sense of the term. His character was without stain.*

JOHN JAY SMITH.

John Jay Smith, of "Ivy Lodge," Germantown, Philadelphia, born in 1798, was a descendant of Smith and Logan, who were associated with William Penn in the founding of Pennsylvania. He interested himself in the movement to lay out finer and more modern cemeteries. Laurel Hill Cemetery, which was opened for burials in October, 1836, was largely started through Mr. Smith's energies. His literary efforts were large. The beautiful English translation from the French of Michaux's "Forest Trees of America," and an edition of M'Mahon's "American Gardener" bear his name as editor on their title pages.†

* For excellent picture see *New Jersey Medical Reporter*, vol. VI, opposite 167 (1852).

† *The Gardener's Monthly* (Meehan), XXIII, p. 378, with portrait as frontispiece.

MATTHIAS KIN.

Matthias Kin was sent to this country in the early part of the century by parties in Germany interested in the collection of North American plants. He traveled somewhat extensively through the Alleghany Mountains chiefly for the purpose of obtaining living plants and seeds. He also collected many interesting specimens, which may be found in the herbarium of the Royal Museum at Berlin, and in the herbaria of Muhlenberg, Willdenow, and the Academy of Natural Sciences.

Mr. Meng, a wealthy banker, living in Germantown, on what is now Vernon Park, seems to have been the financial agent of the Germans who employed Mr. Kin. In order to work to better advantage, the subject of this sketch, when on his exploring expeditions, dressed and had the manners and appearance of an Indian. He was, in fact, called the Indian plant-hunter. When not in the field, he made his home in Germantown.

Many of the rare trees in what is now Vernon Park were presented by Mr. Kin to Mr. Meng.*

MINSHALL PAINTER.

Minshall Painter was born near Media, March 6, 1801, and died of apoplexy, August 21, 1873. He received a good education near his native place. Here he lived the remainder of his life with his brother Jacob, spending most of his time in study and in the garden or arboretum, which he and his brother planted. He was a good botanist, and took great interest in the progress of botany, corresponding

* See Appendix VI.

with Thomas Meehan and John Evans, who had a botanic garden, near Rosemont, Pennsylvania. The library in which he and his brother spent considerable of their time was in a substantial fire-proof building a few rods from the dwelling. He was much respected by all who knew him; by both neighbors and friends.

The merit of the Painters, as botanists, consisted in their arboretum, planted by their own hands on a property of 500 acres, settled by Jacob Minshall in 1701. It passed later to the Painters; Enos Painter marrying Hannah Minshall. Enos and Hannah (Minshall) Painter, the parents of Minshall and Jacob, died about 1840, when the property passed into the hands of their sons, who planted it to trees.

Between 1840 and 1850 they made exchanges with Thomas Meehan and John Evans and others, from whom they obtained many curious trees, shrubs and plants hardy to the climate of southeastern Pennsylvania. The trees were planted in rows, but later by their growth they formed a perfect thicket. The collection still shows some choice specimens, among them the big-tree, *Sequoia gigantea*, and red-wood, *Sempervirens*, a fine cedar of Lebanon, an oriental spruce, and a maple tree. The magnolias, *Magnolia macrophylla*, and *M. Umbrella*, are represented, as also the bald cypress, *Taxodium distichum*, and *Quercus macrocarpa*. The property, after the brothers' death, passed into the hands of their nephew, John J. Tyler, who does not spend more than two or three months on it.*

* The information herein contained was furnished in a letter to Henry S. Conard, of Westtown, Pa., who kindly loaned it to me for inspection. Mr. Conard also wrote a sketch of the Painters, the contents of which he kindly permitted me to use.

JOHN P. HEISTER.

Dr. John P. Heister was born July 3, 1803, in the city of Reading. He died September 15, 1854. When but a youth he evinced a great interest in study, and eagerly perused the books that came within his reach. After receiving the degree of Doctor of Medicine, he located, for the practice of his profession, in his native place. In order to satisfy more fully his thirst for knowledge, and at the same time to benefit his failing health, he determined to take a journey to Europe. On the 16th day of April, 1841, he set sail, and visited England, France, Germany, Italy and Switzerland. After spending a year in Europe he returned to his native place to resume the practice of medicine. He kept notes while on his journey abroad, which were printed under the title of "Notes of Travel," wherein he described the different localities visited by him; especially the different botanical gardens. He described in an enthusiastic sketch his visit to the Jardin des Plantes in Paris.

Botany was his favorite study, although he was also more or less attached to the science of geology. He had a fine collection of specimens of the different woods of Berks County. They were well arranged in library form; a part of the limb or branch formed the back to which was attached a tin box to hold the seed vessels, flowers, etc.*

THOMAS POTT JAMES.

Thomas Pott James† died in Cambridge, February 22, 1882, in the seventy-ninth year of his age, the greater part of his life having been spent in Philadelphia, near which city he was born on September 1st, 1803. His ancestors

* This sketch was kindly furnished by Dr. William Herbst, of Trexlertown, Pennsylvania.

† *Asa Gray Scientific Papers*, II: 419. Also *Proceedings American Academy Arts and Science*, XVII: 405 (1882).

were notable persons in the early settlement of Pennsylvania. He was engaged in business in Philadelphia as a wholesale druggist for over forty years, when he removed to Cambridge, bringing his wife and their four children to her paternal home. From childhood he was more or less devoted to botany; but in later years, having more leisure, he devoted himself exclusively to the study of the mosses, in which he became proficient. After the death of Sullivant in 1873, James and Lesquereux, became the principal authorities upon mosses in this country; and the duty appropriately devolved upon them of writing the systematic manual on North American Mosses* which Sullivant had planned. Owing to the preoccupation of Mr. Lesquereux in paleobotany, the labor of preparation fell upon Mr. James. He had published several papers upon mosses in the Transactions of the American Philosophical Society, of which he had long been an active member. He contributed to Mr. Watson's "Botany of Clarence King's Exploration on the Fortieth Parallel," a notable article on the mosses collected by the botanist of that survey. The American Academy published some of the results of the joint study of these two veteran bryologists. Hundreds of species and varieties had to be patiently examined under the compound microscope, the details sketched, and the differences weighed before description. To this task Mr. James devoted all his energies. He had nearly brought this protracted labor to a conclusion, when the eye was suddenly dimmed and the pencil dropped from his hand. Partial paralysis was soon followed by coma, and he died within a few hours.†

* *Manual of the Mosses of North America*, by Leo Lesquereux and Thomas P. James. With Six Plates Illustrating the Genera. Boston. S. E. Cassino & Co., 1884, octavo pp., V : 447.

† See Charles Pickering, II, Sci. Papers, Asa Gray.

ROBERT KILVINGTON.

Robert Kilvington,* a well-known florist of Philadelphia, was born of a Yorkshire squire in 1803, and died in 1881, at the age of seventy-eight. He became gardener to Mr. Sheaff of Whitemarsh, about fifteen miles from the city. Mr. Kilvington subsequently became engaged in the florist's business, and interested himself in the meetings of the Pennsylvania Horticultural Society. He also took an active interest in the Academy of Natural Sciences, of which his cousin, Dr. Thomas B. Wilson, was one of the founders.

He had his garden at the south-west corner of Nineteenth and Race Streets, where the building of the Academy of Natural Sciences now stands. From there he removed to Locust Street, west of Woodland Avenue, where he died.

GEORGE SMITH.

George Smith,† son of Benjamin Hayes and Margaretta Dunn Smith, was born in Haverford Township, Delaware County, February 12, 1804. He received the earlier part of his education in the schools of the neighborhood, and, later, was a pupil at the Academy in West Chester of Jonathan Gause. He studied medicine at the University of Pennsylvania, and graduated there April 7, 1826. For five years he practiced his profession in Darby and its vicinity, but coming into possession of a very considerable estate, soon after his marriage he retired from medicine, and for the remainder of his life was chiefly occupied in the management of his farms, and in attention to numerous public and private trusts, and in the cultivation of his literary and

* *The Gardener's Monthly* (Meehan), XXIII (1881), p. 345.

† *Pennsylvania Magazine*, VI : 182.

scientific tastes. Dr. Smith married February 26, 1829, Mary, daughter of Abraham Lewis, of Delaware County. His widow and five children survive his death, which occurred on the 12th of February, 1882.

From 1832 to 1836 Dr. Smith was a state senator from the district composed of Chester and Delaware Counties, and during that time was largely instrumental in establishing a law for free education.

On December 8, 1836, he was appointed by Governor Ritner Associate-Judge of the courts of Delaware County, an appointment held by him for six years, and renewed by popular vote for five succeeding years. As Superintendent of the common schools, and as President of the School Board of Upper Darby district, he continued to show deep interest in popular education. In September, 1833, with four of his friends, he founded the Delaware County Institute of Science, of which he was the President from the time of its organization until his death, a period of forty-nine years. This association has objects in view similar if not identical to those of the Academy of Natural Sciences of Philadelphia.

A generous contributor to the periodical papers of his neighborhood, in the year 1862 he published the "History of Delaware County," a work which at once placed its author in the very front rank of careful, painstaking, accurate historians.

Dr. Smith gives besides an instructive sketch of the geology of the county, a copious catalogue of the plants of the same. This list, carefully prepared, is the monument of Dr. Smith's energy and interest in botanical science.

ROBERT HERMANN SCHOMBURGK.

Robert Hermann Schomburgk, a Prussian traveler, was born at Freiburg-an-der-Unstrut, June 5, 1804. He came in 1826 to the United States when he was twenty-two years of age, and, after working for some time as a clerk in Boston and Philadelphia, became a partner in a Richmond, Virginia, tobacco manufactory in 1828. The factory was burned and Schomburgk drifted to the West Indies in 1830, where, after unsuccessful venture, his botanical work attracted the attention of the London Geographical Society and secured him the means to explore the unknown region of the Orinoco, where he traveled from 1833 to 1839, discovering *Victoria regia* and numerous other plants. This work led the British Government, in 1841–1844, to commission him to survey the boundary between Venezuela and Guiana, and to make further exploration. The famous line was drawn and he was knighted by the Queen for his services. Schomburgk, until his death in Berlin March 11, 1865, continued in the British consular service, but he devoted himself to botanical and geographical studies, being a member of the principal American and European learned societies. His works include several books and many scientific papers on Guiana, and a "History of Barbadoes" (1847).

CHARLES PICKERING.

Charles Pickering, M.D.,* died in Boston, of pneumonia, on the 17th of March, 1878, in the seventy-third year of his age. He was of a noted New England stock, being a grandson of Colonel Timothy Pickering, a member of Washington's

* *Proceedings American Academy of Arts and Sciences*, XIII : 414 (1878). An engraving of Pickering hangs in the Academy of Natural Sciences.

military family, and of his first cabinet. He was born on Starucca Creek, on the Upper Susquehanna, Pennsylvania, on a grant of land made to his grandfather, who resided there. His father, Timothy Pickering, Jr., died at the age of thirty years, leaving the two sons, Charles and his brother Edward, to the care of their mother.

Dr. Pickering was a member of the class of 1823 at Harvard College, but left before graduation; preferring medicine, he took the degree of M. D. at the Harvard Medical School in 1826. Living in these earlier years at Salem, he became associated with William Oakes in botanical exploration. It is probable that they first explored the White Mountains together, following in the steps of the first botanist to ascend Mount Washington. Pickering's taste for botany and zoology showed itself in boyhood, and probably decided his choice of a profession. About the year 1829 he took up his residence at Philadelphia; and it is probable that he was attracted thither more by the facilities that city offered for study of science than by its renown as a centre of medical instruction. We soon find him one of the curators of the Academy of Natural Sciences, and librarian, and with reputation established as the most erudite and sharp-sighted of all the young naturalists of that region. His knowledge then, as in mature years, was encyclopedic and minute. During this time he published a brief essay on "The Geographical Distribution and leading Characters of the United States Flora."

When the United States Exploring Expedition to the South Seas, which sailed under command of Lieutenant Charles Wilkes in the autumn of 1838, was first organized under Commodore T. Ap. Catesby Jones, Dr. Pickering

was selected as the principal zoologist. Subsequently, others were added. Yet the scientific fame of that expedition largely rests upon the collections and work of Dr. Pickering and his associate, Professor Dana. Dr. Pickering, although retaining the ichthyology, turned his attention during the three and a half years of the voyage to anthropology, and to the study of the geographical distribution of animals and plants; to the latter especially as affected by the operations and movements of the races of man. To these subjects the remainder of his life was assiduously devoted. Dr. Pickering, a year after the return of the expedition, and at his own expense, crossed the Atlantic, visited Egypt, Arabia, the eastern part of Africa, and western and northern India. As a result of these explorations, in 1848 he published a volume on "The Races of Man and their Geographical Distribution," being the ninth volume of the "Report of the Wilkes' Exploring Expedition." Some time afterward in the fifteenth volume of this series appeared an extensive work on the "Geographical Distribution of Animals and Plants." In the course of printing, appropriations of Congress stopped, and the publication of the results of the celebrated expedition was abandoned. Under a privilege granted by Congress, Dr. Pickering bought out in 1854 a small edition of the first part of his essay,—perhaps the most important part,—and in 1876 a more bulky portion, "On Plants and Animals in their Wild State," which is largely a transcript of the note-book memoranda.

These are all his publications, excepting some short communications to scientific journals and the proceedings of learned societies, but he is known to have been long and laboriously engaged upon a work which a lifetime

seemed hardly sufficient to complete. He was carrying this work through the press at his own expense, when he died. This formidable treatise edited by his wife, Sarah S. Pickering, appeared in 1879 under the title "Chronological History of Plants, or Man's Record of his own Existence." *

"Dr. Pickering was singularly retiring and reticent, very dry in ordinary intercourse, but never cynical; delicate and keen in perception and judgment; just, upright and exemplary in every relation; and to those who knew him well, communicative, sympathetic, and even genial. In the voyage of circumnavigation he was the soul of industry and a hardy explorer."

ROBERT BUIST.

Robert Buist † was born at Cupar Fyfe, near Edinburgh, Scotland, on November 14, 1805, and when quite young went to learn the business of a gardener under the late James McNab, curator of the Edinburgh Botanic Garden. To complete his knowledge, he went through a course at Elvaston Castle, the seat of the Earl of Harrington, one of the most famous gardening establishments in England. In August, 1828, he arrived in America, and obtained employment in the nursery of David Landreth, which at that time was one of the best known in America. The camellia houses were particularly famous, and *Camellia Landrethii* remains to this day a worthy monument of the early efforts of this firm to improve that plant. Buist later obtained a

* "Chronological History of Plants, Man's Record of His Own Existence. Illustrated through their Names, Uses, and Companionship." By Charles Pickering, M. D. Boston: Little, Brown & Co. 1879. 4to., pp. xvi, 1222.

† *The Gardener's Monthly*, XXII, p. 372 (1880). Portrait as frontispiece.

situation as gardener to Henry Pratt, who, at that time, had perhaps the most beautiful garden in the United States. This was at Lemon Hill, which has since become a part of Fairmount Park.

It was about the time of young Buist's arrival in Philadelphia that the tremendous strides in horticulture about Philadelphia began, in which he subsequently took a leading part. The nurseries then in existence in and near the city were Bartram's, conducted by Colonel Carr; M'Mahon's; Landreth's, in Moyamensing; Maupay's, at Rising Sun, and Hibbert's, which was probably the first florist's establishment. In the whole city of Philadelphia there were only two greenhouses which kept gardeners, though there were a few more in the suburbs. Such a thing as a bedding plant was unknown. Hardy herbaceous plants and box edgings made up the chief garden attractions, and only those who had greenhouses with rare exotics believed they had much of which to be particularly proud. During the year 1829 the Pennsylvania Horticultural Society had its first grand exhibition.

In 1830 Mr. Buist entered into partnership with Mr. Hibbert, and Hibbert & Buist did an immense business as florists at Twelfth and Lombard Streets. They commenced at once the importation of rare plants and flowers, paying attention especially to the rose. Among the importations were the Noisette rose and Jaune des Prez, on which they made a clear profit of $1000. Later, on Mr. Hibbert's death, Robert Buist commenced the seed business at No. 84 Chestnut Street, then No. 97, removing finally to the present situation, No. 922 Market Street.

While a florist Mr. Buist introduced a number of

rarities. From Mr. Tweedie, for whom Sir William Hooker named a Verbena, *V. Tweediana* and the genus of plants *Tweedia*, he obtained the above-mentioned Verbena. Through the Mexican Minister, Mr. Poinsett, *Poinsettia pulcherrima* was introduced.

Mr. Buist was well known by his writings. His "Rose Manual," his "Family Kitchen Garden," and his "Flower Garden Directory," were in their day the principal practical garden guides.

Personally, Mr. Buist was tall, and to his death as straight as a well-trained soldier. He was thrice married. His eldest son died before his father, Robert, his only living son, carrying on the business since his father's death, which occurred July 13, 1880, at Rosedale, Philadelphia.

ROBERT BRIDGES.

Dr. Robert Bridges* was born in Philadelphia, March 5, 1806, and died in the city, February 20, 1882, at the ripe age of nearly seventy-six years. He was elected a member of the Philadelphia Academy of Natural Sciences January, 1835, and held many offices of trust in that institution and the American Philosophical Society, of which he was also a member.

His work in botany consisted of an Index of the Genera in the Herbarium of the Academy prepared by him and Dr. Paul B. Goddard, presented August, 1835. He was elected a member of the Botanical Committee, January, 1836, was chairman of it from December, 1846, and served till December, 1857, twenty-one years, when he declined re-election. On the 23d of May, 1843, he presented a new Index

* A fine oil painting of Dr. Bridges is hung in the library of the Academy of Natural Sciences.

of the Herbarium and one of Menke's Herbarium from the Committee, a work which was long the main guide to the botanical collections.

No striking invention, no discovery in science is ascribed to him, but laboriousness, sincerity of purpose, and faithfulness were so manifest in all his ways that he had the confidence of all.

WILLIAM WYNNE WISTER.

William Wynne Wister,* who was the oldest member of the family of that name, died early on Saturday morning December 17, 1898, at his home, 5140 Germantown Avenue, aged ninety-two years. Mr. Wister suffered a fracture of the hip, July, 1898, and it was thought that he had almost recovered from the effects of the injury, as he was able to be wheeled out in a chair on fine days, but on Friday evening he sank into unconsciousness, from which he never rallied.

Mr. Wister was born in Philadelphia November 25, 1807, and was a son of Charles J. Wister, prominent as a literary man. He was educated in the Germantown Academy, and on arriving at maturity, engaged in business. He soon became interested in banking, becoming a large stockholder in the Germantown National Bank, of which he was for many years a Director and Vice-President. In 1866 Mr. Wister was elected President of the bank, and only retired a few weeks ago, when it became apparent that he would not be able to resume active work, though he remained a director.

Mr. Wister, who was an enthusiastic botanist in his younger days, got his inspiration when quite a lad by

* *Philadelphia Ledger*, December 19, 1898, p. 2. The date of his birth in my notes, taken on a visit to Mr. Wister in 1896, is March 25, 1807.

hearing the lectures of Thomas Nuttall, in the Germantown Academy in 1818. During his life Mr. Wister became acquainted with many local botanists, and at eighty-nine it was a pleasure to tell anecdotes concerning them.*

His surviving family consists of two sons, William Wynne Wister, Jr., and Alexander W. Wister, and four daughters.

JACOB ENNIS.

Jacob Ennis † was born in Essex County, New Jersey, in 1807. He came of Scotch-Irish ancestry on the paternal side, and was of Dutch extraction (the Doremuses) on the maternal side. After he had graduated at Rutger's College, and while quite a young man, he connected himself with the Dutch Reformed Church, and was by that Church sent to the islands of Java and Sumatra as a missionary, where he remained four years. Here his powers of observation and his love of nature had an early development. Returning to his native land, he engaged in educational work, and was elected Professor of Natural Sciences in the National Military College of Bristol, Pennsylvania, and later became Principal of the Scientific and Classical Institute of Philadelphia, where he spent the best part of his life as its proprietor. He also occupied for some years the chair of physical sciences in the State Normal School at Shippensburg, Pennsylvnia. As an educator, he laid great stress on the importance of the study of nature, anticipating by perhaps a quarter of a century the recognition that scientific studies have subsequently had in all the higher institutions of learning. During several years of his residence in Philadelphia, he led out

* See page 144.

† 1890. *Popular Science Monthly*, XXXVII : 137, from which the main facts of this sketch are taken.

into the field for the study of botany a class of teachers and others interested in the science. The writer of this book remembers while a lad of accompanying the professor on several of his excursions. One in particular he remembers as taken to Rockland, and another to the Wissahickon, in Fairmount Park. The stimulus which he received from these excursions probably determined him many years afterward to make botany his life-work. The life of Professor Ennis was quiet, simple, dignified and laborious. He was a member of a number of the chief scientific societies both in this country and abroad, and his contributions in the shape of addresses before learned societies, pamphlets and articles in scientific periodicals were many and varied, always strikingly original, and sometimes prophetic. Among these contributions, chiefly on astronomical problems, was one entitled "The Two Great Works to be done on our Sidereal Systems." In his book on "The Origin of Stars," published over twenty years ago, some of the most transcendental problems of physical astronomy were attacked. Professor Ennis's sympathies were not narrow; he was familiar with the entire range of English and classical literature, and was an excellent linguist. His literary style was simple, direct and lucid; he had a great dislike for "big words," and always succeeded in making his ideas clear by the use of plain and untechnical language, even when handling the most abstruse problems. His habits and tastes were simple, his wants few, his disposition kind and gentle, and the attitude of his mind was distinctly reverent. He was so quiet, modest and unobtrusive, that but few suspected the presence of a great thinker so near at home, and still fewer knew him personally. He died in Houston, Texas, January 12, 1890.

JOSEPH CARSON.

Dr. Joseph Carson * was born in Philadelphia on Easter Monday, the 19th of April, 1808, and died December 30, 1876, in his sixty-ninth year. His paternal ancestors were originally from Scotland, and belonged to that rigid and staunch Presbyterian denomination which has made its deep impress upon the politics and institutions of our country.

The rudiments of young Carson's education were obtained at the Germantown Academy, then under the patronage of Mr. John Brewer, a very highly respected teacher in his day. The building still stands in School Lane, bearing the coat of arms of George IV, a relic of the olden time. As he grew older he was placed under the tuition of Mr. White, of Philadelphia.

From Mr. White's school Mr. Carson entered (at the age of fifteen years) the Sophomore Class of the University of Pennsylvania, at this time under the presidency of the Rev. Frederick Beasley, D. D. The early part of his collegiate life was somewhat ruffled, from his not being as well prepared as he should have been, and his having to relearn his Latin pronunciation. This annoyed him greatly. Nor did he, at best, much relish his academic career, and probably would not have pursued his studies here had it not been for the persistent efforts of a devoted aunt, who helped and encouraged the young student. Having resolved on this course, he showed, as he did throughout his life, a determination to do his part faithfully, and to strive for excellence; so that, with close application to his books

* Memoirs of Joseph Carson, M. D., by James Darrach, M. D., read before the College of Physicians, Philadelphia, May 7, 1879, extracted from the "Transactions," Third Series, Volume IV.

for three years, he graduated with honor, and received his diploma as Bachelor of Arts on July 27, 1826.

He had now, at the age of eighteen years, completed his collegiate course, which brings him to a most important epoch of a man's existence. Feeling the necessity of doing something for a livelihood, he selected a business life, and was induced to enter the wholesale drug store of Dr. Edward Lowber. He did not, however, remain here long, the daily routine of trade being uncongenial to his tastes and constitution of mind. An impulse was given, while employed by Dr. Lowber, to the study of botany, the Doctor being a botanist.

This study soon filled Mr. Carson's mind, and it was not long before he became an enthusiastic lover of plants, and made frequent excursions for their collection; he was also led from the study of abstract botany to investigate the medicinal virtues of his floral acquisitions, and while collecting for his herbarium, he made decoctions and infusions of the plants, testing their effects upon his own person. These trips into the country served, no doubt, to relieve the monotony and wearisomeness of his business life. Having made up his mind to study medicine, he entered, as a private pupil, the office of Dr. Thomas T. Hewson, one of the distinguished physicians of his day, and from his preceptor's office he matriculated at the Medical Department of the University of Pennsylvania, and received his degree of Doctor of Medicine in the month of March, 1830, having presented for graduation a thesis on animal temperature, an essay (though not marked by originality) exhibiting research, method, clearness of thought, unambiguous style, and sound reasoning; all of which qualities

continued to characterize his writings and teaching in after life.

Soon after graduating Dr. Carson was elected one of the resident physicians in the Philadelphia Almshouse, then situated on Tenth Street, betweeen Spruce and Pine. He did not, however, immediately enter upon the practice of his profession, but determined to take a voyage to the East Indies. Dr. Carson set sail as surgeon, on board the ship "Georgiana," commanded by Captain John Land; during which voyage he visited Madras and Calcutta, returning to Philadelphia August 3, 1832, having been absent nearly a year. While on this expedition he kept a journal, in which we find, neatly and methodically arranged, tables indicating the temperature of the sea and air, and the barometical conditions of the atmosphere, with excellent drawings, some of them colored, of the flora and fauna, which did not escape his quick senses and inquiring mind. His description (recorded in the journal) of sea-sickness, as experienced by himself, is graphically and clearly given, with its physiological causes and conditions well presented.

After his return from India we find Dr. Carson, at the age of twenty-four years, entering upon the duties of the practitioner, and he was not an exception in regard to the customary tardiness with which the public receives the young physician, since for the first nine years his monetary realizations from practice were very small. At the expiration of this time, and at thirty-three years of age, he was united in marriage with Mary Goddard, sister of Dr. Paul B. Goddard, and granddaughter of Paul Beck, of this city. From this union there was no living issue, and Mrs. Carson was prematurely carried off within a year of their marriage.

After remaining a widower for seven years, Dr. Carson formed a second matrimonial alliance with Mary Hollingsworth, daughter of Henry Hollingsworth, who was for many years Cashier of the Bank of North America. The four children from this marriage were Henry (who died in infancy), Hampton L., now a prominent lawyer, Ann C. and Susan, who are left to mourn a loving and devoted father. After the first ten years Dr. Carson's practice increased very much, and he eventually gained an excellent position as a practitioner of obstetrics. This branch of the profession, however, necessitating much labor, wore upon his health, compelling him to curtail his practice, which he finally gave up for more congenial pursuits.

From this time he begins to fill various positions of honor, responsibility and trust. He also found time to cultivate history, literature and biography; penetrated somewhat into antiquarian pursuits.

The first institution to which Dr. Carson became attached was the Academy of Natural Sciences, to which he was elected on October 29, 1835, and was one of its most active and useful members. He assisted in arranging and caring for the herbarium, was Librarian for two years, and aided in preparing and publishing a catalogue of books; was a member of the publication committee for two years, and served as Secretary during six months in 1837. He ultimately became one of the vice-presidents, which position he occupied from December, 1869, to December, 1875. He made communications to the Academy over a period of forty-three years. At a period anterior to this, Dr. Carson had reached another round in the ladder which he was gradually but surely ascending, namely, his election to be

Professor of Materia Medica in the Philadelphia College of Pharmacy, which election took place in 1836; he held this post until the year 1850. While occupying this position, he was assiduous in other good works, still working zealously for the Academy of Natural Sciences, and adding to the duties and labors of his chair the editing of the *American Journal of Pharmacy*, assisted by Dr. Bridges, and subsequently by Professor William Proctor. While connected with the College of Pharmacy, Dr. Carson edited, with notes and additions, two editions of Pereira's "Materia Medica," and in 1847 published his beautiful and creditable "Illustrations of Medical Botany," in two quarto volumes, having, it is said, drawn and colored many of the plates himself.

In the spring of 1844, Drs. Carson, Paul B. Goddard, Wm. Poyntell Johnson, Caspar Morris, M. P. Hutchinson, James B. Rogers and William W. Gerhard, became the lecturers in the Medical Institute of Philadelphia, which had "originated under the auspices of Dr. Chapman, Professor of Theory and Practice of Medicine in the University of Pennsylvania."

He was elected a physician of the lying-in department of the Pennsylvania Hospital, to fill the place of Dr. Charles D. Meigs, resigned, and occupied this position, associated with Dr. Hugh L. Hodge, from 1849 until May, 1854, when this part of the hospital was closed.

Dr. Carson was elected a member of the American Philosophical Society, and was its Curator for seventeen years; he also served on the publication committee and on the library committee. He was highly esteemed as a member of the Board of Directors of the Philadelphia Trust and Safe Deposit Company, to which position he was elected

in February, 1872. There were various other associations with which he was connected. He was a member of the National Convention for revising the Pharmacopœia of the United States, and served on the Committee of Revision and Publication in 1860, and was Chairman of the Committee and President of the Convention in 1870. He was a member of the Philadelphia County Medical Society, and its President in 1862, and was one of its delegates to the Quarantine Convention, held in Cincinnati in May, 1861. He was elected honorary member of the College of Physicians and Surgeons of Reading, Pennsylvania, in 1870; of the State Medical Society of New York, and of the Philadelphia College of Pharmacy. He was physician of the Foster Home in 1840, and was elected a consulting physician of the Hospital of the Protestant Episcopal Church in May, 1852. He was elected a Fellow of the College of Physicians in December, 1838, and was one of its censors for several years, and continued to occupy this position up to the time of his death. The College elected him as one of its delegates to the National Medical Convention held at Philadelphia, May, 1847, which became subsequently the American Medical Association. He was appointed a member of the Committee on Indigenous Botany; was frequently appointed a delegate to the annual meetings of the American Medical Association, and was elected one of the College's representatives to the International Medical Congress of 1876.

We have next to consider Dr. Carson from the time he became a Professor in the University of Pennsylvania. When Dr. George B. Wood was transferred from the chair of materia medica to that of the theory and practice of medi-

cine, made vacant by the resignation of Dr. Nathaniel Chapman, Dr. Carson applied for the position, now without an occupant because of the transfer. His well-earned reputation, and his already established position as a learned and successful teacher and writer, made the selection an easy one, though his competitors were men of distinction. He was therefore duly elected, and assumed the responsibilities of Professor of Materia Medica and Therapeutics in the oldest medical school in America, in the year 1850, and held this chair until May, 1876, a period of twenty-six years, when he resigned on account of ill-health, and was then made one of the emeritus professors of this institution.

Dr. Carson was always a great favorite with his classes. His genial and sympathetic manner, and the parental regard he manifested towards them, created a strong affection between preceptor and pupils. He was ever ready to listen to their troubles, and help them out of their difficulties; and these intimate and kindly relations did not cease with graduation, but were continued by correspondence, which, increasing year by year, entailed upon the kind professor a labor which few knew of or appreciated.

He was not a voluminous writer, yet what his pen undertook was accomplished and complete. His powers of research and sound discriminating judgment, made all his essays studies of their kind. One work, however, will ever be a monument of his ability as a historian; I refer to his "History of the Medical Department of the University of Pennsylvania," a work which cost him much labor, and displays great learning, and which also we should look up as a testimonial of the regard, love, and loyalty which he bore to his alma mater, and the theatre

of his usefulness and fame. Perhaps it was this work which prevented his finding time to write a book on materia medica, which was his intention. His admirable synopsis, however, may be considered as a text-book on this branch.

"Blessed with an accurate and retentive memory, he had accumulated by extensive reading and intercourse with intelligent men at home and in different parts of our country, large stores of precise and miscellaneous information, from which he drew freely on appropriate occasions. He was fluent in conversation, and ready in debate, unsensual and unselfish in constitution, placidly cheerful in disposition, and always self-possessed and respectful in his deportment to all. He quickly made friends, and was rarely deserted by any whom he had once attached to himself. He was considerate towards his inferiors, charitable to the indigent, generous to the unfortunate, and ever ready to contribute from his stores of knowledge to assist others in their pursuits."

Bibliography.

1. "On the Erythræa chilensis." — *Journal of the Philadelphia College Pharmacy*, VI, January, 1835.

2. "Notes on the Species of Cassia which yield Senna." — *American Journal Pharmacy*, October, 1836, and January, 1837.

"Medico-botanical Notices," Nos. 9-12.—*American Journal Pharmacy*, January, 1837.

"Medico-botanical Notices," No. 13.—*American Journal Pharmacy*, October, 1837.

3. "Notes on the Taccaceæ."—*American Journal Pharmacy*, January, 1838.

4. "Notice of the true Jalap plant."—*American Journal Pharmacy*, April, 1838.

5. "Medico-botanical Notices," No. 14.—*American Journal Pharmacy*, July, 1838.

6. "Note upon Gentiana Chirayita."—*American Journal Pharmacy*, April, 1840.

7. "Note upon the Cinchona bicolorata."—*American Journal Pharmacy*, April, 1841.

8. "Observations on Zamia integrifolia."—*American Journal Pharmacy*, April, 1842.

9. "On an article called Texas Sarsaparilla."—*American Journal Pharmacy*, January, 1844.

10. "Notice of some Brazilian Drugs."—*American Journal Pharmacy*, July, 1845.

11. "On Drimys chilensis, The Winter's Bark of Chile."—*American Journal Pharmacy*, June, 1847.

12. "Illustrations of Medical Botany, consisting of coloured figures of the plants affording the important articles of Materia Medica, and descriptive letter-press." By Joseph Carson, M. D. Quarto. Robert P. Smith. Philadelphia, 1847.

13. "On Drimys Winteri.—*American Journal Pharmacy*, August, 1847.

14. "An Essay on Scammony, with an examination in the qualities of the drug found in the market."—*American Journal Pharmacy*, January, 1848.

15. "On Black Hellebore (Helleborus niger)."—*American Journal Pharmacy*, July, 1848.

16. "On Quassia amara."—*American Journal Pharmacy*, October, 1848.

17. "On Quassia excelsa."—*American Journal Pharmacy*, January, 1849.

18. "Note on India Opium."—*American Journal Pharmacy*, July, 1849.

19. "Note on India Cinnamon and Red Sarsaparilla."—*American Journal Pharmacy*, October, 1849.

20. "Calisaya Bark."—*American Journal Pharmacy*, April, 1850.

21. "Remarks on the California Nutmeg."—*American Journal Pharmacy*, September, 1854.

22. "Note on Nectandra Puchury-major and minor, as the source of Pichurim oil, Pichurim bark and bean."—*American Journal Pharmacy*, September, 1855.

23. "On the Fecula of Alstrœmeria."—*American Journal Pharmacy*, July, 1860.

24. "On the source of the Balsam of Peru."—*American Journal Pharmacy*, July, 1860.

25. "A History of the Medical Department of the University of Pennsylvania, from its foundation in 1765. With sketches of the lives of deceased professors." By Joseph Carson, M. D. 8vo., pp. 227. Lindsay and Blakiston, Philadelphia, 1869.

J. K. ESHLEMANN.

Dr. J. K. Eshlemann was a native of Lancaster County, the son of Jacob Eshlemann, an extensive land-owner and miller, residing near Leaman Place on the Pequea, and who was called by his neighbors "King of the Octoraro," on account of his owning so much land in that district. He was born March 2, 1810, and at an early age developed a fondness for study. He received a liberal education under the eminent instructor, Dr. Keagy, of Harrisburg, and afterwards of Philadelphia. Choosing the medical profession, he graduated with honor from both Castleton Medical College of Ohio, and the Jefferson Medical College of Philadelphia. He located at Strasburg, in his native county. In 1840 he married Fanny Edge, the second daughter of Ruth and the late John Edge, of East Caln, in Chester County, and in 1848 he purchased the "Glen Isle Farm," where he resided until his demise.

His great fondness for pomology and botany led him to develop an extensive arboretum of ornamental and fruit-bearing trees and small fruits. He was one of the founders of the Pennsylvania Horticultural Society and the Fruit Growers' Society, and in recognition of his attainments, was made the first president, and served as such for some years. He died October 7, 1897, leaving a wife, two daughters, and six grandchildren.*

* *West Chester Local News*, October 7, 1897.

TRAILL GREEN.

Dr. Traill Green * was born at Easton, Pennsylvania, May 25, 1813, and died in Easton, Pennsylvania, April 29, 1897. From early youth he devoted himself to the study of natural history. His interest in science led him to medicine. Entering the medical school of the University of Pennsylvania, he graduated from that institution in 1835.

He returned to Easton and established a practice there. In 1837 he was made Professor of Chemistry at Lafayette College. He received the degree of A. M. from Rutgers in 1841, and was later called to the chair of natural science at Marshall College, in Mercersburg, Pennsylvania (1841-1848). Here he pursued botany to considerable extent. In 1866 Washington and Jefferson University conferred the degree of LL. D. upon him. In 1865 he was elected Professor of Natural Science at Lafayette College. He presented the astronomical laboratory to Lafayette College, and was always deeply interested in science. From 1865-1891 he was Professor of Chemistry in the same institution. Dr. Green was a member of many different scientific societies, and was an author of note, having written a number of scientific books and articles. "Zoological and Floral Distribution of the United States" (1861) seems to have been the only botanical article from his pen. With all the labor implied in an extensive practice and a professorship, he found time for other work. He had classes of boys and girls in botany, and it was a rare season when he was not instructing somebody in the natural sciences.

* See *Lehigh Valley Medical Magazine*, 1897, for the memorial meeting held in Bethlehem, June 18, 1897, and reprint "In Memoriam," with photograph.

JACOB PAINTER.

Jacob Painter was born June 22, 1814, near Media, Pennsylvania, and was educated at a school in Troy, New York, about 1836. After graduating there, he journeyed to Chicago by stage, returning to his home in Delaware County by the national road to Washington. He lived with his brother, Minshall, and together they planted an arboretum, containing later a number of fine specimens. Jacob, after the death of his brother in 1875, went to Florida, enjoying the trip so much that he never ceased talking of it until his death, which occurred November 3, 1876.*

AUBREY H. SMITH.

Aubrey H. Smith, son of Thomas Smith, a member of Congress and United States Senator, who had an estate of 3000 acres at Tinicum, where the quarantine station now stands, was born at this place in 1815. He studied law in the office of his brother, Israel Taylor Smith, and practiced at the Philadelphia bar. Mr. Smith was counsel for the Baltimore and Ohio Railroad Company. He was a friend of General Grant, and during the first presidential term of the latter he was United States District Attorney. Mr. Smith was an active botanist, having collected extensively and formed an excellent and extensive herbarium, which was presented to the Biological School of the University of Pennsylvania after his decease. He presented to the Philadelphia Academy of Natural Sciences many interesting botanical communications, having been elected to that body March, 1876. One communication, in particular, is especially noteworthy—"On the Colonies of Plants observed near Phila-

* See sketch of Minshall Painter, his brother, page 184.

delphia," printed in the *Proceedings of the Academy of Natural Sciences* for February, 1867. In this paper Mr. Smith records observations on 106 ballast plants, especially from the South, as found on the ballast heaps of Philadelphia. For some time Mr. Smith botanized with Messrs. Martindale, Burk, Diffenbaugh and Parker, and it is to the labors of these men conjointly that our knowledge of the recently introduced floral strays is due. It may be said that these observations will be of great use to the future phytogeographer, who may desire to trace geographically the European, Asiatic and South American plants, introduced into the United States and now growing spontaneously.

Mr. Smith married Miss May Rose Grier, a daughter of Justice Grier, of the United States Supreme Court. Before his death, which occurred in 1891, his impaired hearing kept him from court-room work, and his time was devoted to the business of estates, of which he had many to settle. His death resulted from pneumonia, the result of a chill. At the time of his death Mr. Smith was a United States Commissioner.

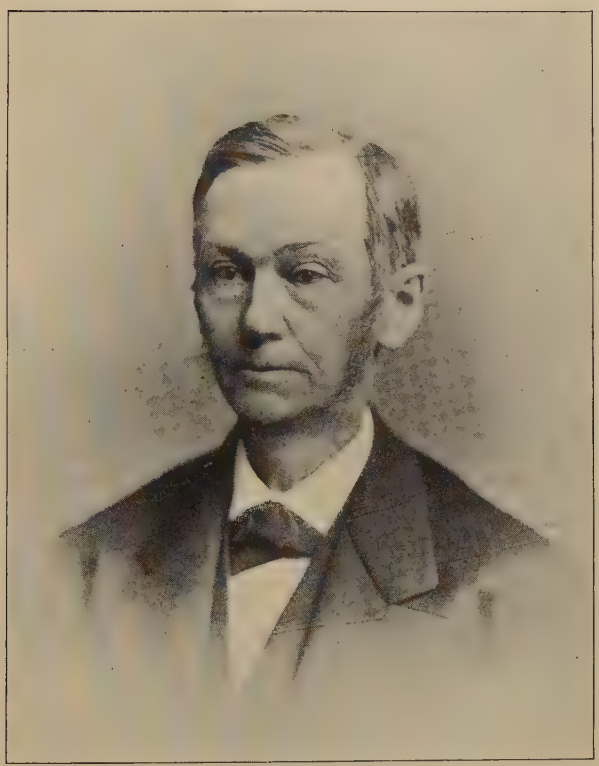
JOHN REDFIELD.

On the banks of the beautiful Connecticut, and near the center of the state of the same name, is to be found the place anciently and still called Middletown; and, in accordance with a custom, nowhere so common as in New England, of retaining for off-shoots from the original settlements the name of the mother town with a prefix or suffix, the little hamlet, a few miles up the river, was, of old, called by the somewhat quaint name of "Middletown Upper Houses," now changed to the unmeaning one of Cromwell.

Here, on July 10, 1815, John Redfield * was born. He could claim John and Priscilla Alden among his ancestors, and was, in every way, of pure New England blood. Many of his family had been sea-captains, a vocation nowhere represented by more honorable, hardy and vigorous men than on our northern coast. His father, William C. Redfield, at this time a country store-keeper in humble circumstances, was a man of enterprising character and of an unusually inquiring and vigorous mind. The son only knew his mother as an invalid, and she died when he was but four years old. Our friend's first public education came from the district school, which his father had taken great pains to have above the usual standard. In addition, there were the "spelling classes" and "friendly associations," and a small circulating library, agencies which he acknowledged to have been aids to him in his aspirations for knowledge.

About this time steam navigation was occupying his father's mind, and after some efforts in that way on the Connecticut, his attention was turned to the Hudson. He was frequently in New York for long periods, while his son's education was continued for a year and a half at Stamford. Finally, in 1834 the family was removed to New York. The boy was now sent to the High School, where, under the influence and instruction of one of the teachers, a Mr. Barnes, he was instructed in mineralogy, and had many a pleasant ramble in the country in his company. His school education was finally completed by a short course, which he provided for himself at a private school, but between these two periods he attended the chemical lecture course of Dr. John Torrey, an association

* 1895. *Torrey Bulletin*, XX, 162, with portrait. William M. Canby.



JOHN H. REDFIELD.

UNIVERSITY OF ARIZONA
LIBRARY

which must have had great influence in his pursuits in after life. His first business occupation was in a dry goods store, where he continued long enough to acquire a thorough detestation of it. He then assisted his father in his steam transportation ventures, and this occupied his business hours for many years. It was intensified when, in 1836, he became a member of the New York Lyceum of Natural History, of which Dr. Asa Gray was then the librarian and superintendent. Here was commenced that friendship which was destined to be close and lasting. It was at this time that he acquired a taste for conchology, in which he made much progress, and which resulted in a number of papers on this subject published in the Annals of the Lyceum. He thoroughly explored the country in the vicinity, over land much of which is now closely built upon, and in every way which the time at his command and his means permitted, strove to advance the scientific interests of himself and his associates. As early as 1846 he became a member of the Academy of Natural Sciences of Philadelphia. In 1843 he made a very happy marriage, and this, perhaps, was the eventual cause of his removal to Philadelphia in 1861, where he long held a prominent position in the extensive and well-known car-wheel works of A. Whitney & Sons, with the members of which his marriage connected him. His allegiance was necessarily transferred from the Lyceum to the Academy, of which he soon became a life member, and was gradually advanced to many of its most important and laborious offices. Thus, in 1870 he became a member of its Council, and was also made Conservator of its Botanical Section, the latter a most important office, as it placed the various and very important

herbaria in his charge. He was Corresponding Secretary of the Conchological Section in 1879, and after having been long a member of its Publication Committee, was made its chairman in 1891. It will thus be seen how important his services were to this institution, and how great the esteem in which his good sense and active exertions, as well as his wise and thoughtful counsel, were held by his associates.

But beyond all this, and especially after his retirement from business cares in 1885, he accomplished a great work which no one else connected with the Academy had time to do, and for which, indeed, no one was better fitted than he. When he took charge he found four distinct herbaria, as follows: that of Dr. C. W. Short; that of De Schweinitz, composed principally of fungi, very many of them types; the General Herbarium, and the North American Herbarium, the latter of which is of the utmost value, not only because of its size and completeness, but also because it contains a large number of type specimens of Nuttall, Pursh, and others of the early botanists of the country. The specimens in these were loose in sheets of paper, very often those of more than one collector huddled in together, with the labels but loosely attached to the specimens. On the death of Elias Durand only one worker was left to give a few hours a day to its care. Its condition may be imagined by the reply of Dr. Gray to an application for a share in some specimens *—"What is the use of throwing valuable material into a dust-bin." With great care and good judgment, and an indefatigable energy, he brought order out of this confusion, so that at last he had got the greater and more valuable parts of the herbaria arranged and mounted and properly catalogued. Nor did his benefactions end

* 1895. *Botanical Gazette*, XX, p. 195.

with this, for he purchased all valuable sets of plants, and bestowed them upon the Academy. The tender and appreciative minute adopted by it, and hereafter appended, is but a fitting testimony to his usefulness and unselfish devotion.

Mr. Redfield lived for many years in one of the pleasantest parts of Philadelphia and quite close to the Academy. He made occasional botanical excursions, of which notable ones were to the mountains of North Carolina, in company with Dr. Gray and other botanists. There could not have been a more delightfully cheering and obliging traveling companion. In later years his summers were spent on Mount Desert Island. The excellent catalogue of its flora, lately published by Mr. Rand and himself, attest his industry while there.

It is impossible to speak too highly of Mr. Redfield's personal character. Honorable, sincere, courteous, cheerful, always ready to do a kind act or to say a gracious word, he displayed that true nobility of character which comes of right principle faithfully adhered to, yet without a trace of aceticism or austerity.

After some weeks of failing health, he died on the 27th of February, 1895, in the eightieth year of his age.

A beautiful western grass, the *Redfieldia flexuosa*, commemorates his name and services.

The Academy of Natural Sciences adopted the following minute:

"The Academy of Natural Sciences of Philadelphia has heard with deep sorrow the announcement of the death of John H. Redfield, who, in his unselfish devotion to its interests has long been one of its most active benefactors.

"Always an earnest student of nature, his last years of deserved freedom from business engagements were devoted to his favorite studies in connection with the Academy, and to the arrangement and care of the Herbarium.

"The steady growth and admirable condition of the botanical collection constituted an enduring memorial of his industry and zeal.

"As Chairman of the Publication Committee and Member of the Council, the same fidelity and discretion characterized the discharge of his duties.

"He was a man of strong but tender character; firm in his support of the right, but tolerant of all honest difference of opinion; cheerful, gentle, modest and cultured. Time to him was one of his most precious possessions, yet he was ever gladly at the service of those requiring advice or assistance.

"He was an earnest student, a wise counsellor and a steadfast friend. His encouragement and loving sympathy endeared him to his associates, who felt for him a personal affection which enables them to appreciate the irreparable loss sustained by his family, to whom they would offer their heartfelt sympathy."

Testimonials were also passed by the New York Academy of Sciences and the Torrey Botanical Club. The Botanical Section of the Academy of Natural Sciences, of Philadelphia, which had under consideration the subject of a monument commemorative of the services to botanical science of the late Conservator of the Herbarium of the Academy, issued a circular, as follows: *

* See *Science*, N. S., I: 470; *Bulletin Torrey Botanical Club*, XXII: 182. Philadelphia *Ledger*, April 2, 1895.

"It has been decided that no better monument to the memory of John H. Redfield could be erected than to arrange for completing and caring for the work he loved, and to which he gave freely so many years of his life—namely, the Herbarium of the Academy of Natural Sciences. Mainly through his disinterested labors, it stands to-day scarcely second to any in the United States, containing, besides many unnamed, over 35,000 named species of flowering plants and ferns, the half of which have been verified and fastened down.

"No one can probably be found to give the years of time he so freely gave. In order to carry on the work, and add to the collection, as exploring expeditions afford the opportunity, it has been proposed to establish a Redfield Memorial Herbarium Fund.

"Mr. Redfield's will provides that his herbarium, minerals, shells and scientific works shall be sold to help the Herbarium, thus furnishing a nucleus for the proposed fund. It is in mind to raise $20,000, but the interest of any sum that may be contributed can at once be made available.

"Statements will be furnished from time to time to contributors, keeping them informed of the progress of the contributions."

Bibliography.

1. "Note on the first discovery of Schizæa pusilla."—*Proceedings Academy Natural Sciences*, Philadelphia, 1869 : 13.

2. "Search for Corema Conradii in Monmouth County, N. J."—*Proceedings Academy Natural Sciences*, Philadelphia, 1869 : 91 ; *American Naturalist*, III : 327.

3. "Are certain Species of Botrychium epiphytic?"—*Proceedings Academy Natural Sciences*, Philadelphia, 1870 : 91.

4. "Tetramerism in Lilium auratum, Lindl."—*Bulletin Torrey Botanical Club*, II : 32. August, 1874.

5. "Oaks and Mistletoe."—*Bulletin Torrey Botanical Club*, IV : 13. (1873).

6. "Fertilization of Asarum Canadense."—*Bulletin Torrey Botanical Club*, IV : 21. (1873.)

7. "Dr. Torrey and Torrey's Peak."—*Bulletin Torrey Botanical Club*, V : 18. (1874.)

8. "On Asplenium ebenoides."—*Proceedings Academy Natural Sciences*, Philadelphia, 1874 : 155.

9. "Geographical Distribution of the Ferns of North America."—*Bulletin Torrey Botanical Club*, VI : 1. (1875.)

10. "Notes upon Anychia dichotoma."—*Bulletin Torrey Botanical Club*, VI : 61. (1875.)

11. "Note upon Dr. Torrey's First Trip to the New Jersey Pines, prefixed to a letter of his, July 9, 1818."—*Bulletin Torrey Botanical Club*, VI : 82. (1876.)

12. "Notice of the Botanical Correspondence of Zaccheus Collins in possession of the Academy of Natural Sciences of Philadelphia."—*Proceedings Academy Natural Sciences*, Philadelphia, 1876 : 81. (1876.)

13. "Southern Localities of Lygodium palmatum."—*Bulletin Torrey Botanical Club*, VI : 232. (1878.)

14. "Obituary notice of Robert H. Browne."—*Bulletin Torrey Botanical Club*, VI : 291. (1879.)

15. "Aspidium aculeatum in Pennsylvania."—*Bulletin Torrey Botanical Club*, VI : 291. (1879.)

16. "Aspidium aculeatum at Bushnellsville Clove in Catskill Mountains."—*Bulletin Torrey Botanical Club*, VI : 331. (1879.)

17. "Notes of a Botanical Excursion into North Carolina."—*Bulletin Torrey Botanical Club*, VI : 331. (1879.)

18. "Dissent from Mr. Meehan's Views upon the Timber-line of high Mountains."—*Proceedings Academy Natural Sciences*, Philadelphia, 1880 : 345. (1880.)

19. "Herbarium of the Academy of Natural Sciences of Philadelphia." *Bulletin Torrey Botanical Club*, VIII : 42. (1881.)

20. "The Muhlenberg Herbarium."—*Bulletin Torrey Botanical Club*, VIII : 80. (1881.)

21. "Aspidium Lonchitis, Swz. in Colorado."—*Bulletin Torrey Botanical Club*, VIII : 105. (1881.)

22. "Occurrence of Hieracium aurantiacum, in the Catskill Mountains."—*Bulletin Torrey Botanical Club*, 8 : 112; *Proceedings Academy Natural Sciences*, Philadelphia, 1881 : 429. (1881.)

23. "Biographical Sketch of Dr. William Baldwin." — *Botanical Gazette*, VIII : 233. (1883.)

24. "Note upon the Date of a Letter from Dr. Torrey to Amos Eaton." —*Botanical Gazette*, VIII : 317. (1883.)

25. "Corema Conradii and its Localities."—*Bulletin Torrey Botanical Club*, XI : 97. (1884.)

26. "Obituary Notice of John Williamson."—*Bulletin Torrey Botanical Club*, XI : 104. (1884.)

27. "Further Notes upon Corema Conradii."—*Bulletin Torrey Botanical Club*, XII : 93. (1885.)

28. "Insular Vegetation, Flora of Great Duck Island, Maine."—*Bulletin Torrey Botanical Club*, XII : 103. (1885.)

29. "On the Flora of Martha's Vineyard and Nantucket."—*Proceedings Academy Natural Sciences*, Philadelphia, 1885 : 378. (1885.)

30. "Still further Notes upon Corema Conradii."—*Bulletin Torrey Botanical Club*, XIII : 220. (1886.)

31. "Euphrasia officinalis on the Coast of Maine."—*Bulletin Torrey Botanical Club*, XIII : 232. (1886.)

32. "On Insular Floras."—*Bulletin Torrey Botanical Club*, XIII : 245. (1886.)

33. "Re-discovery of Corema Conradii in Monmouth County, New Jersey."—*Bulletin Torrey Botanical Club*, XVI : 192 (1889); *Proceedings Academy Natural Sciences*, Philadelphia, 1889 : 135.

34. "Pinus Banksiana with Corema Conradii on Schoodic Peninsula, Coast of Maine."—*Bulletin Torrey Botanical Club*, XVI : 295 (1889); *Proceedings Academy Natural Sciences*, Philadelphia, 1889 : 344.

35. "Stellaria humifusa on the Coast of Maine."—*Bulletin Torrey Botanical Club*, XVII : 38. (1890.)

36. "Notice on the Occurrence of Scabiosa australis near Pittsfield, Massachusetts."—*Bulletin Torrey Botanical Club*, XIX : 341. (1892.)

37. "Obituary Notice of Isaac C. Martindale."—*Bulletin Torrey Botanical Club*, XX : 98. (1893.)

38. "A Preliminary Catalogue of the Plants Growing on Mount Desert and the adjacent Islands. By Edward L. Rand and John H. Redfield. Cambridge, 1894. Octavo pp. 286.

ISAAC BURK.

Isaac Burk, one of the best informed of local Philadelphia botanists, was born at Aston, Delaware County, September 1, 1816. He removed to Philadelphia in 1838, where he opened a merchant-tailor shop on Spruce Street, below Sixth. He also had a store on Coates Street, now Fairmount Avenue. Having very poor health, he was advised by his physician to seek out-door employment, and heeding his physician's advice, he purchased a *Ledger* route, which he held for thirty years. He was a student of botany from his boyhood, and his love for the science did not desert him in manhood, for all of his leisure time was spent in making collections of plants and in the study of natural history in general. He helped to classify and arrange the plants in the collection of the Academy of Natural Sciences, of which he was a life member. In 1880 he presented his entire herbarium, which represented so many years of toil and collection, to the Biological Department of the University of Pennsylvania, where it is carefully maintained as a special collection especially rich in local and introduced plants. The ballast plants, to which Mr. Burk gave so much attention, are especially well represented. Mr. Burk was, in several cases, the first botanist to report the introduction of weeds to this country, which have since become so widely distributed. It is to this side of his botanical work that we must look for the most valuable results achieved for science. He was familiar with the literature relating to plants, and was the author of a series of articles on the Flora of Fairmount Park, which appeared in the *Public Ledger* of Philadelphia, prior to the Centennial year. Several articles from his pen were published in the

Proceedings of the Academy of Natural Sciences. In 1888 he was elected a member of the American Philosophical Society. On March 30, 1893, Isaac Burk died of general paralysis. He was warned, however, by premonitory symptoms, for once while arranging the plants in the herbarium at the University, while on the ladder, he toppled over and fell; so ardent was his desire to leave the botanical collection at the University in good shape for future usefulness. He had ten children, of whom four survive: Rev. Jesse Y. Burke, Rector of St. Peter's P. E. Church, Clarksboro, New Jersey, and Secretary of the Board of Trustees of the University of Pennsylvania; Addison B. Burk, Assistant Managing Editor of the *Public Ledger*; Charles Burk, Foreman in Collins' Printing House, and the late Dr. William H. Burk, for years Associate Editor of the *Public Ledger* and Botanist of the Peary Expedition to the Arctic regions in 1891.

FRANCIS WOLLE.

After a painful and protracted illness, Rev. Francis Wolle* died at his home in Bethlehem, Pennsylvania, February 10, 1895.

He was born at Jacobsburg, Northampton County, Pennsylvania, December 17, 1817. His ancestors, for two generations, were conspicuously associated with the Moravian Society, and during his long and useful life he was always prominent in the Moravian Church and educational affairs. Although a few of his earlier years were spent in business, he soon turned his attention to teaching as his life-work, and in 1858 he became Vice-Principal of the celebrated

*1893. *Bulletin Torrey Botanical Club*, XX, p. 211. C. H. Kain.

Moravian Seminary for Young Ladies, at Bethlehem, Pennsylvania. In 1861 he became Principal of the institution, and conducted its affairs with marked ability until 1881, when the increasing infirmities of age necessitated his seeking rest.

From his childhood the study of natural history was his favorite pursuit, and after his retirement from active professional work in 1881, he devoted himself to it with more ardor than ever. He was especially known among botanists as an authority on fresh-water algæ and desmids. In 1884 he published his "Desmids of the United States and List of Pediastrums.* The volume contained 1100 illustrations on fifty-three colored plates. This was followed in 1887 by two volumes on "The Fresh-water Algæ of the United States, complimental to Desmids of the United States."† This work was illustrated by 117 colored plates, embracing 2300 figures. In 1891 he brought out a work the "Diatomaceæ of North America."‡ This contained 2300 figures on 120 plates. All of the illustrations enumerated were photo-lithographs from India-ink sketches made by the author. During 1892 there appeared a revised and enlarged edition of the "Desmids of the United States."

His contributions to cryptogamic botany are recognized by scientists at home and abroad as standard works

* "*Desmids of the United States and List of American Pediastrums,*" *with eleven hundred illustrations on fifty-three colored plates,* by the Rev. Francis Wolle, Bethlehem, Pennsylvania. Moravian Publication Office, 1884, pp. xiv, 168.

† "*Fresh-water Algæ of the United States* (*exclusive of the Diatomaceæ*) *complimental to Desmids of the United States,*" *with 2300 illustrations covering one hundred and fifty-one plates. A few colored, including nine additional plates of Desmids,* by the Rev. Francis Wolle, Bethlehem, Pennsylvania. *The Comenius Press*, 1887.

‡ "*Diatomaceæ of North America.*" *Illustrated with twenty-three hundred figures, from the author's drawings, on one hundred and twelve plates,* by the Rev. Francis Wolle, Bethlehem, Pennsylvania. *The Comenius Press*, 1890.

FRANCIS WOLLE.

UNIVERSITY OF ARIZONA
LIBRARY

of great value. The particular field of his investigations had previously been but little worked, but his labors have stimulated research in these very attractive by-paths of science. He will long be remembered by those who were his friends and correspondents for his kindliness of heart, as well as for his conscientious care in the department of science, to which he devoted the energies of his later years.

Bibliography.

1. "Fresh-water Algæ."—*Botanical Gazette*, III-IV : 68.

2. "Mosses of Pennsylvania."—*Torrey Bulletin*, VI : 36.

3. "Fresh-water Algæ," Nos. 1, 2, 3.—*Torrey Bulletin*, VI : 121, 137, 181.

4. "A Nostoc, the Matrix of Scytonema."—*Torrey Bulletin*, VI : 217.

5. "Fresh-water Algæ. Synopsis of Discoveries and Researches in 1878."—*Torrey Bulletin*, VI : 281.

6. "Fresh-water Algæ," No. 4.—*Torrey Bulletin*, VII : 43.

7. "New American Desmids."—*Torrey Bulletin*, VII : 91.

8. "American Fresh-water Algæ."—*Torrey Bulletin*, VIII : 1, 37 ; IX : 25 ; X : 13 ; XI : 13 ; XII : 1, 125.

9. "Turner's New Desmids of the United States."—*Torrey Bulletin*, XIII : 56.

HALLIDAY JACKSON.

Halliday Jackson,* son of Halliday and Jane (Hough) Jackson, was born near Darby, Delaware County, Pennsylvania, December 27, 1817. His father was a prominent member of the Society of Friends, and in early life spent two years among the Seneca Indians, instructing them in various industrial pursuits, and in 1830 published a work on the "Civilization of the Indian Nations."

Halliday, Jr., attended Friends' School at Darby, and assisted on the farm. At the age of seventeen, after the

* 1888. Halliday Jackson—*Poems.*

death of his father, he went to the boarding-school of Samuel Smith, in Wilmington, Delaware. The following winter was spent at the school of Benjamin Hallowell, at Alexandria, Virginia, and upon his return he made his home with his brother, John, who founded Sharon Boarding-school. At the age of nineteen he commenced teaching school, an occupation he continued for several years.

In 1846 he married Caroline Hoopes, daughter of Thomas and Eliza Hoopes, of West Goshen, Chester County, Pennsylvania. In 1846 he was chosen Principal of Friends' Institute in the City of New York; this position he held for five years. While there he met with a sad bereavement in the loss of his wife, leaving him with one son. In 1854 he married Emily Hoopes, sister of his first wife. Returning from New York he continued teaching until 1863, when his health became impaired, and in order to have the benefit of out-door life, he purchased a farm near West Chester, where he lived until 1881, when he removed to the town.

In the summer of 1883 he spent some time in the mountains of Western North Carolina, and most of the winter of 1884-85 in Florida, studying the botany and zoology of that region. He had a large herbarium, acquired by personal collection and by exchange. Dr. Darlington mentions him frequently in the "Flora Cestrica." He also had considerable collections of algæ and fungi. He owned one of the first microscopes made by Zentmayer, of Philadelphia, and during the last few years of his life devoted much time to microscopy, studying especially cryptogamic botany. His collection of plants was deposited at Swarthmore College after his death, which occurred August 6, 1887.

EDWARD TATNALL.

Edward Tatnall was born on the 30th of September, in the year 1818, in the village of Brandywine, then a suburb of the Borough of Wilmington, Delaware, now a ward of that city. His first botanical lessons were under Joseph C. Strode, at East Bradford, Chester County, Pennsylvania, and as botany was taught in that day (by memorizing pages of glossary), the class of fourteen was disgusted, saying, if that was botany they wanted none of it. Edward, alone, scaled the glossary wall.

He collected many plants in Chester County in 1831 and 1832, and in 1833 and 1834, while attending Haverford College, also many in Delaware County, Pennsylvania. In 1867 he spent three months in traveling through the far West, from Cincinnati, Ohio, to Springfield, Illinois, by private conveyance, which afforded opportunity for collecting many specimens. At Chicago, then a village, he collected seven plants between the "Lake House" and the lake shores. The trip extended to Mineral Point, Wisconsin, and later, to the Falls of St. Anthony, where there were no signs of any habitation. About 1853 he first visited Dr. Darlington at West Chester, seeking advice about a *Scutellaria*, found on the rocky banks of Brandywine Creek, which he pronounced to be a variety of *S. nervosa*, but which was afterward described as *S. saxatilis* Ridd. It is the only known locality east of the Alleghany Mountains.

On June 3, 1859, he forwarded to Dr. Gray specimens of *Potamogeton crispus*, which before that time had been denied an existence in this country. Dr. Gray replied in his usual laconic style: "The *Potamogeton* is *P. crispus* exactly, and you have fixed it as a native of this country."

On the ninth he writes: "I have made a note of this discovery in the July number of *Silliman's Journal.* * * * I think it very interesting."

In 1860 Mr. Tatnall published a catalogue of the plants of New Castle County, Delaware, and among others he sent a copy to Dr. Gray, who says: "I have yours of the 14th and the catalogue. This looks very well, indeed. I see no cause for you to be ashamed of it." July 25th he writes: "In spite of the perfect (mostly) flowers, your plant is *Sagittaria calycina* Englm. Glad to have it." June 1, 1860, he says: "It would be well, I think, to dry a good number of specimens of *P. crispus*, a species which no one but yourself has detected in this country." It was collected later by others: Meehan, Hoopes, Porter. December 17, 1861, Dr. Gray relaxes his style in saying: "Your specimen (*Lychnis vespertina*) in letter of 14th inst., which I asked for to swear by, came in a condition tempting the profane rather to swear at, being well smashed up." W. T. Sullivant, in a letter November 19, 1860, in a humorous way, says: "Thanks for the two Sagittarias. Phænogamous botany, though I am sorry to say * * * with me is divided into two parts—one that I knew but have forgotten, and the other I never knew."

During the season of 1895 Mr. Tatnall, then in his seventy-eighth year, made twenty-eight pedestrian trips through the county, averaging ten miles each, collecting many specimens, very few, however, that were new.

Mr. Tatnall died suddenly at Wilmington, May 30, 1898, in his eightieth year.*

* See *Botanical Gazette*, XXVI: 378, November, 1898.

BENJAMIN M. EVERHART.

Benjamin M. Everhart, for many years associated with J. B. Ellis in the study of the fungi, was born in 1818. He is one of the best mycologists that America has ever produced, having done much good work with Mr. Ellis in the description of new and rare plants. Having kept a general store in West Chester, in which he took much pride, Mr. Everhart amassed a considerable fortune, and is looked upon as one of the wealthiest men in West Chester. By his neighbors he is considered rather unapproachable and peculiar, and a man ready to push a close bargain. His study occupies a separate building from the house, which is a large brick one, rather over-furnished within. In person Mr. Everhart is a man of striking appearance; his nose is aquiline, his forehead low, his beard is scant and fringing, his eyes are bright, and his smile pleasant. At the age of seventy-seven he is still a man of considerable activity, although slightly deaf.*

CHARLES E. SMITH.

Charles E. Smith † was born in Philadelphia on the 1st of November, 1820, the son of Charles E. and Mary (Ogden) Smith. His parents were of the strictest sect of the Society of Friends, and Mr. Smith was carefully brought up in the principles and faith of this peculiar but admirable people. He owes much for the sterling qualities of his own character to the firm, sound character of his parents. He was a student for three years at the Westtown school, but at the age of eighteen began the practical work of his life.

* A visit was paid to Mr. Everhart in 1895 by the writer, in company with Dr. William Sharpless, of West Chester.

† 1893. *The National Magazine.* A Monthly Journal of American History. April, XVII, p. 567. Article by L. A. Bond. (The National History Company, 132 Nassau Street, New York.)

His first efforts were along the lines of his greatest future usefulness. He was attached to an engineer corps which had in hand the survey and construction of a railroad from Blossburg, Tioga County, Pennsylvania, to Corning, New York. This is the present Tioga Railroad. The character of the service which young Smith rendered in the construction of the road, and the impression upon others which his faithfulness and signal abilities made, are shown by the fact that upon its completion he was appointed Superintendent of the new line. Later on, this supervision was extended over the Blossburg coal mines as well.

Mr. Smith returned to Philadelphia in 1844, and very soon thereafter entered into business on his own account. He built the Fairmount Rolling-mill in 1846, but the repeal of the tariff that same year made it unprofitable. He sold out his interest to his partners, and soon thereafter became manager of the extensive Rensselaer Iron Works, at Troy, New York. These works were the first in the Empire State to engage in the construction of railroad iron.

Mr. Smith presently became the chief organizer of the most famous coalition ever created in the iron industries. In December, 1849, a convention of the iron manufacturers of Pennsylvania was held in the City of Philadelphia. The object was to co-operate in an effort to secure a re-enactment of the tariff of 1842, which had protected their interests and was necessary for their future prosperity. But it was found at the convention that they were all strangers to one another. Some preliminary acquaintance must be secured. In this dilemma Mr. Smith volunteered to canvass the entire State of Pennsylvania and to present a report of his trip. The report drawn up by Mr. Smith was presented and

printed, and this was the origin of the American Iron Association. It continued under that name until 1864, when the present designation, the American Iron and Steel Association, was adopted.

In 1861 Mr. Smith was elected President of the Philadelphia and Reading Railroad Company. He held this position throughout the Civil War, and until his resignation in 1869. Since that time he has been interested with various important enterprises. Mr. Smith has always held a high position socially. In 1877, and again in 1878, he was elected President of the Union League of Philadelphia. Other similar honors have been conferred upon him. For many years he has identified himself with the Botanical Section of the Academy of Natural Sciences, in connection with which he has done much active work. He has always taken a deep interest in the Herbarium and has done much to extend its usefulness to the working botanist by identifying and studying the plants therein contained.

CHARLES F. PARKER.

Charles F. Parker * was born in Philadelphia, November 9, 1820. His mother dying when he was but an infant, he was deprived of that stimulation and encouragement which a mother alone can give. His father, being in humble circumstances, was able to give him but a limited education. Charles, as soon as he was old enough to be of any service, was apprenticed to book-binding, his father having long been engaged in that business.

He remained in Philadelphia until about the age of twenty-two years, when he went to Boston and engaged in

* *Proceedings of Academy of Natural Sciences*, 1883, p. 260.

the same business. After residing there about two years he married Mary Kellom, and in 1851 left Boston and moved to Leominister, where he opened a book-store, and carried on book-binding on his own account. This business enterprise, not being so successful as he had hoped, was abandoned in 1853, and he removed to Camden, New Jersey, where he resided during the remainder of his life. About two years after the death of his mother, his father married again, and when the father died in 1835, his widow continued to carry on the book-binding business, and Charles became a partner, and assumed the management, subsequently conducting the work on his own account.

During the early part of his life he did not manifest any especial interest in natural history, yet for a long time he was a companion of C. S. Rafinesque, the well-known naturalist, who boarded in the same house. This was during the latter part of the life of Rafinesque, when he was engaged in the manufacture of medicines. Very soon after removing to Camden, Charles Parker became interested in conchology and entomology, which he pursued industriously. He became acquainted with members of the Academy of Natural Sciences, and was elected a member of that body August 29, 1865. In 1874 he was elected one of the curators.

Although he continued his interest in the study of conchology, he seemed to have taken an especial fondness for the study of botany, which he never allowed to falter. He was one of the first to discover that the ballast deposits in and around Philadelphia and Camden were prolific in introduced plants, and his knowledge of conchology sometimes enabled him to determine the part of the world from

which those deposits came, as occasionally fragments of shells were found therein.

In one of his journeyings to the swamps of Cape May County he met Colonel F. Austin, the noted cryptogamic botanist, who died at Closter, New Jersey, a few years ago, and who at that time was engaged in the study of the flora of New Jersey. There at once sprang up a real friendship between them, which increased as time advanced, terminating only when Austin died. The interest, however, which had been created to endeavor to complete a list of the plants of New Jersey was not allowed to abate. A preliminary catalogue was later compiled by Professor N. L. Britton, and printed under the auspices of the Geological Survey of the State, in which the name of C. F. Parker frequently appears. Probably no botanist made more frequent visits to the pine barrens and swamps of New Jersey, nor collected so extensively as he did. The collection of New Jersey plants which he has left is one of the finest and most perfect that exists, and is, of itself, a monument of patience and skill of which any one might feel proud.

Paralysis of the brain terminated his life on the 7th day of September, 1883, in the sixty-third year of his age.

WILLIAM GAMBEL.

William Gambel * was born in New Jersey about 1821. In his boyhood he seems to have attracted the attention of Thomas Nuttall, who employed him as an assistant in his trips. In 1844 Gambel journeyed to the southern Rocky Mountains with a party of trappers on an ornithological and botanical trip, for the Academy of Natural Sciences of

* SARGENT. *Silva of North America*, VIII, 35.

Philadelphia. The published account of his travels, entitled "Description of Plants collected by William Gambel, M. D., in the Rocky Mountains and Upper California," by Thomas Nuttall, appeared in the *Journal of the Academy of Natural Sciences*, 2d ser., I : 149 (1847–50). In this paper Gambel's name is perpetuated in a scrophulariaceous plant, *Gambelia speciosa*,* a figure of this plant with description being published. Returning to Philadelphia the following year, he entered the Medical School of the University of Pennsylvania, from which he graduated in 1848. He was made Recording Secretary of the Philadelphia Academy, but resigned from this position the following year to accompany a party organized by I. J. Wistar to cross the continent to the California gold fields. The leader, Isaac J. Wistar, became afterward a distinguished officer in the Union army, a philanthropist and President of the Academy of Natural Sciences. The party started from Independence, Missouri, about the first of May, and traveled up the Platte River, where Gambel left to join a party of Missourians, led by Captain Boone, of Kentucky. Gambel's fate is described in the following extract of a letter from General Wistar to Professor Sargent: "In the year 1850, I met two men of Boone's train at Foster's Bar, who gave me the first information I had received of the fate of the majority of the overland party. Being well furnished and provisioned, and mostly older men than me, they traveled leisurely and reached the Sierras only in October. After the loss of most of their cattle and consequent abandonment of many wagons in the Humboldt Desert, they were caught by snow in the mountains, and instead of abandoning the remainder and pushing

* See MEEHAN. *Native ferns and flowers of the United States*, ser. 2, II : 62.

through, they camped to await better weather, which did not come. But few got across the range, including Gambel, and these saved little but what they stood in. With numbers rapidly diminishing the remnant pushed on down to Rose's Bar, where several, including Gambel, died almost immediately of typhoid fever. Gambel was buried on the Bar which, however, as I have understood, has since been entirely removed by hydraulic mining. His death occurred in the latter part of November, 1849, and I have never since seen any of the survivors of his party or heard any further particulars.

"He was a genial, kindly man and delightful companion, but averse to a rough life, hard work and short commons, then inseparable from such a journey. He was about twenty-eight at the time of his death, and had he lived to cultivate more congenial pursuits at home, would certainly have attained increased distinction as a naturalist. His taste for natural science was great, his attainments considerable, and his work even in youth valuable." His name is also commemorated in an oak, *Quercus Gambelii*, discovered by him in 1844.

GRACE ANNA LEWIS.

Grace Anna Lewis * was born on a farm belonging to her parents, John and Esther Lewis, of West Vincent Township, near Kimberton, Chester County, Pennsylvania, the 3d of August, 1821. Both parents were descended from the Quakers. Her father was the fifth in descent from Henry Lewis, of Narberth, Pembrokeshire, Wales, who came to the country about the beginning of 1682. Her father

* 1893. "*A Woman of the Century.*" Willard and Livermore.

died, leaving a wife and four daughters. Grace Anna was then not three years old. Before her marriage the mother had been a successful teacher, at first of her own brothers and sisters, and later of large and flourishing schools. She was eminently fitted for the task of educating her children. After twenty-four years of widowhood she died, leaving her oldest and youngest daughters with Grace Anna, in the home known as "Sunnyside." Grace Anna studied for the love of it in prosperity, and it became her consolation in sorrow.

She first studied botany, as a school-girl, under Abigail Kimber, of Kimberton, Pennsylvania, a friend and correspondent of William Darlington, and her name, in acknowledgment of plants found in her neighborhood, occurs in the "Flora Cestrica." Miss Lewis began teaching botany in 1840. In the field of general natural history her most important work has been the preparation of a "Chart of the Class of Birds;" a "Chart of the Vegetable Kingdom;" a "Chart of the Races of Men;" a "Chart of Geology, with Special References to Paleontology;" "Microscopic Studies, including Frost Crystals and the Plumage of Birds, as well as the Lower Forms of Animal and Vegetable Life;" "Studies in Forestry with original Paintings of Forest Leaves;" "Water Color Paintings of Wild Flowers," and illustrations for lectures on plants and animals. In 1869 she printed a small pamphlet showing the relation of birds in the animal kingdom. That pamphlet was the result of long studies, both in her home and on the old farm, and with the benefit of the library and collection of the Academy of Natural Sciences, Philadelphia, under the direction

of John Cassin, one of the leading ornithologists of the world. It was the germ of her later and improved charts. In 1876 she exhibited in the Centennial Exposition a wax model along with her Chart of the Animal Kingdom. Here Professor Huxley and other prominent naturalists found opportunity of examining her productions, and they were highly commended. Fortified by the encouragement of the best zoologists of England and America, her confidence was now assured, and she was ready to apply the same principles to the construction of a "Chart of the Vegetable Kingdom," which was completed in 1885. In 1870 Miss Lewis was elected a member of the Academy of Natural Sciences of Philadelphia. She is at present honorary member of the Rochester Academy of Sciences, Rochester, New York; of the Philosophical Society of West Chester, Chester County, Pennsylvania; of the New Century Club of Philadelphia; of the Women's Anthropological Society of America, Washington, District of Columbia; and recently has been elected a life member of the Delaware County Institute of Science, in Media, where she now resides. Miss Lewis continues to lead a busy life, and as Secretary of the Delaware County Forestry Association does much quiet work for the cause of forestry. Under her supervision there is now being issued a series of Tree Charts, for use of public schools. The following have been so far printed and issued:

PART I.—"The Oaks," forty-two pieces.

No. 1.—"Biennial Fruited Oaks, Black Oak and Allies."

No. 2.—"Annual Fruited Oaks, White Oak and Allies."

No. 3.—"Southern, Pacific, Hardy, Foreign, and examples of extinct Oaks."

PART II.—"The Nut-Bearers." Numerous species.

No. 4.—"The Chestnuts and Beeches."—American, Japanese and European Chestnuts.

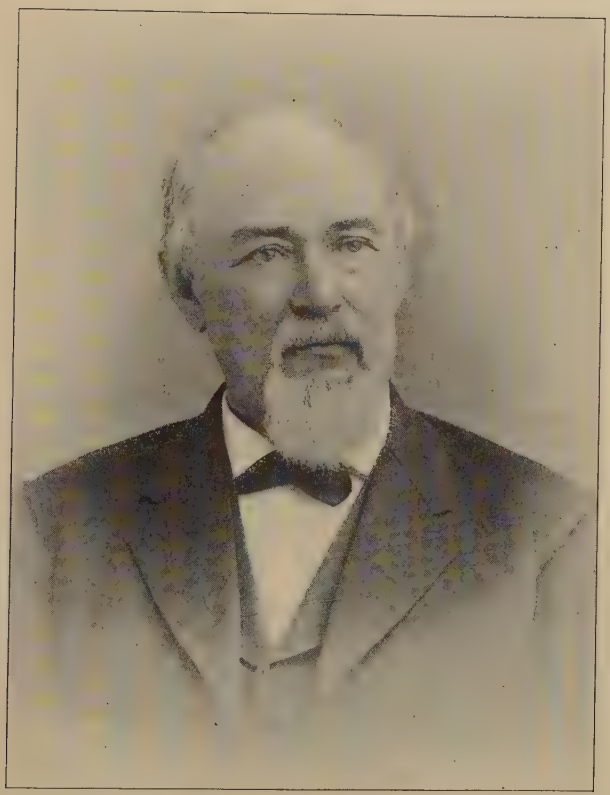
No. 5.—"The Walnuts."—American, Japanese and European species and varieties.

No. 6.—"The Hickories."—American species and varieties.

PARTS III and IV, which are to follow in due order, will consist of species chosen from the most useful or ornamental of our other timber and shade trees.

THOMAS CONRAD PORTER.

Dr. Porter was born at Alexandria, Huntingdon County, Pennsylvania, January 22, 1822. He is of Scotch-Irish descent on his father's side, and of pure German on that of his mother. After two years' preparation in the Harrisburg Academy, he entered Lafayette College in 1836, receiving his first degree in 1840. Passing through the full course of Princeton Theological Seminary, he was licensed to preach by the Presbytery of Huntingdon, in May, 1844. For one year from April, 1846, he served a mission church in Central Georgia. In May, 1848, he took charge of the Second Reformed Church of Reading, Pennsylvania, then just organized, and was ordained and installed as its pastor. In May, 1849, he resigned, to become Professor of the Natural Sciences in Marshall College, Mercersburg, Pennsylvania, then under the presidency of the Rev. Dr. J. W. Nevin. On its removal and consolidation with Franklin College, at Lancaster, Pennsylvania, in 1853, he was elected to the same chair, and became a member, and the Secretary of the Board of Trustees, and Chairman of the Building Committee. These positions were given up July, 1866, in order to accept from his Alma Mater the chair which he has now occupied for a quarter of a century. During this



THOMAS C. PORTER.

UNIVERSITY OF ARIZONA
LIBRARY

period, in connection with his college work, he served as Pastor of the First Reformed Church of Easton for seven years, from 1877 to 1884. In 1865 the degree of D. D. was conferred upon him by Rutgers' College, and that of LL. D. by Franklin and Marshall in 1880. Outside the sphere of his official duties, Dr. Porter has delivered a great many sermons, lectures and addresses on public occasions. Among his printed works are: "The Life and Times of Ulric Zwingli," from the German of Hottinger; "The Life and Labors of St. Augustine," from the German of Dr. Philip Schaff, and a version of Gœthe's "Hermann and Dorothea," in prose. His many translations of Horace's odes and the translation of the "Dies Iræ," rank high. The *Mercersburg Review* is indebted to him for a number of valuable articles on literary and theological subjects. He was an active member of the committee which framed the Order of Worship, now used by the Reformed Church in the United States, and at the celebration of the 300th anniversary of the Heidelberg Cathecism in Philadelphia, January, 1863, read an original memoir of its authors and a translation of the essay on the University of Heidelberg, by Dr. Hundeshagen, both of which are published in the Tercentenary Monument. To Dr. Schaff's "Christ in Song," he contributed several hymns and lyric poems, from the Latin and the German, and not a few of like character to *The Lafayette* and its predecessors. In the preface to his poetical version of the "Kalevala," Dr. J. M. Crawford makes special acknowledgment of his great obligations to his old professor for advice and assistance.

In the scientific world, as is well known, Dr. Porter has achieved high distinction, and that chiefly in the domain

of botany. One of the founders and the first President of the Linnæan Society of Lancaster County, for thirteen years he explored its territory, going over the ground where Muhlenberg had ranged before him, and, in 1869, published a catalogue of its flora. On coming to Easton, in 1866, he organized a natural history society in the College, for local work, which continued in active operation up to the burning of Pardee Hall in 1877, and during this time large collections were made of rocks, animals and plants, and a considerable library formed. His own herbarium, already extensive, became the property of the College, and, since then, has been greatly enlarged by his untiring labors, until it ranks among the first in the land. It contains specimens from all parts of the world, but is especially rich in plants of the United States, both east and west of the Mississippi, and well represents the growth of our knowledge in this field for the last half a century. It comprises a flora of the State of Pennsylvania, which is, by far, the fullest and best in existence. This most valuable herbarium was, with the exception of the fine one of Pennsylvania plants, consumed by fire on December 18, 1897, which occurred by the act of an incendiary in Pardee Hall, where the collections were stored. The mineralogical collection and many valuable books and apparatus were also destroyed. The collections made by Dr. Hayden in the Rocky Mountains from the year 1870 to 1874 passed through his hands, and his reports upon them are to be found in the publications of the survey by the government. Of these, the most important, "A Synopsis of the Flora of Colorado," prepared conjointly with President Coulter, of Wabash College, was issued in a separate volume in 1874.

To Walling & Gray's "Topographical Atlas of Pennsylvania" (Philadelphia, 1872), he furnished a "Sketch of the Flora of Pennsylvania," with a colored map, and to Gray's "Atlas of the United States," 1873, a "Sketch of the Botany of the United States," also with a colored map. In addition to these he has contributed from time to time many valuable articles to the botanical journals, and is in constant correspondence with leading naturalists at home and abroad. He is an honorary member of the American Philosophical Society and the Academy of Natural Sciences, Philadelphia; of the Davenport Academy, Iowa; an active member of the Torrey Botanical Club, New York, and a Fellow of the American Association for the Advancement of Science.

Founders' Day at Lafayette College (October 20, 1897) was observed by paying tribute to the services rendered by Professor Porter to the cause of science, of religion and of literature. Professor William B. Scott, of Princeton, spoke on Dr. Porter's contribution to geological science; Dr. John M. Crawford, of Cincinnatti, spoke of Dr. Porter as a pioneer in Finnish Literature. Dr. N. L. Britton, Director of the New York Botanical Gardens, referred to Dr. Porter in his address on "The Progress of Systematic Botany in North America," in these words: "During the last half of the century Professor Porter has contributed information and material of great value to practically all the monographers of groups or of floras during that period; his collecting and critical observations began shortly after his graduation from Lafayette College in 1840, and have continued uninterruptedly for nearly fifty years. Always ready and anxious to aid, he has supplied to other authors far more information than he has personally published, so

that the list of his printed papers, numbering fifty-three titles, is but an imperfect record of his contributions to botanical science."

Dr. Porter is a gentleman of fine æsthetic sense, indulges himself in a wide range of belles-lettres studies and is especially familiar with the poetic literature of several modern languages, as well as of the classic Latin and Greek. His love of the beautiful might have been inferred from his enthusiastic pursuit of botanical study, and indeed, the same taste and ardor have made him acquainted with all elegant learning.

He is a man of kind heart, and, in the presence of one or more of "the boys," always full of interesting conversation. Here his wonderful memory shows itself to be a storehouse not only of scientific facts, but also of numberless reminiscences, amusing and otherwise, of his early life and the lives of the great men with whom he is acquainted.

He is a theologian familiar with all the departments of theology, a thorough biblical scholar, and has the art of wise exposition, and of direct, practical, pungent preaching. Happy in the tones of his voice, he combines in his delivery the persuasive with the demonstrative in good proportions and always holds attention.

His wonderful enthusiasm over his subject was the strength of his teaching. Yet he was hindered in his department by the want of assistance. Dr. March, in his recent address on "The Needs of Lafayette," said: "He has carried on all these departments with energy and with honor during many years of happy growth, and now they have outgrown the possibilities of a single man. The thronging classes in the lecture room, the frequent classes

to be taken on field excursions, the great herbarium and other collections, require more than twenty-four hours a day. Dr. Porter's aid is also sought constantly in preparing publications of permanent importance. Our comrade of Torrey, Gray, Leidy, Schaff, has stores of truth and wisdom which mankind would not willingly let die. He ought to publish freely. He needs an assistant, or an associate to divide the field."

Dr. Porter, although now seventy-seven years old, is still hale and active. May he long be spared to the college whose interests he has so much at heart.

1. "List of Plants collected by Mr. Thaddeus A. Culbertson on an Expedition to the Mauvaises Terres and Upper Missouri, in 1850."—*Fifth Annual Report Smithsonian Institution*, 1850.

2. "Catalogue of Plants collected during the Expedition of F. V. Hayden to the Headwaters of the Yellowstone River, in the Summer of 1871."—*United States Geological and Geographical Survey of Montana and Adjacent Territories.* Washington, 1871, pp. 477-498.

3. "Catalogue of Plants collected in Wyoming and Colorado, by F. V. Hayden and B. H. Smith."—*United States Geological Survey*, Washington, 1872.

4. "Synopsis of the Flora of Colorado (in conjunction with J. M. Coulter)."—*United States Geological and Geographical Survey, Miscellaneous Public.*, No. 4, pp. 180, pamphlet, Washington, 1874.

5. "Orders Polemoniaceæ, Borraginaceæ, Scrophulariaceæ, Labiatæ and Polygonaceæ in Botany of Wheeler Survey."—By J. T. Rothrock Vol. 6. Washington, 1878.

6. "Enumeration of the Indigenous and Naturalized Plants of Lancaster County, Pennsylvania."—*Mombert's Authentic History*, Lancaster, 1869.

7. "Sketch of the Botany of Pennsylvania." *Walling and Gray's Topographical Atlas*, Philadelphia, 1872.

8. "Sketch of the Botany of the United States."—*Gray's Atlas*, Philadelphia, 1873.

9. "A List of the Carices of Pennsylvania."—*Proceedings Academy Natural Sciences*, Philadelphia, 1887.

10. "A List of the Grasses of Pennsylvania."—*Bulletin Torrey Club*, XX, pp. 193–207. These grasses, mounted on cardboard, were on exhibition at the World's Fair in Chicago.

11. "Contributions to the Species of Juncus growing around Lancaster, Pennsylvania, one hundred specimens of each to Dr. Engelmann's Herbarium Juncorum Boreali Americanorum Normale," issued from St. Louis, November, 1868.

12. "Contributions to the Catalogue of Plants found in New Jersey," by N. L. Britton.—*Final Report of the State Geologist*, vol. 2, Trenton, New Jersey, 1889.

13. "Contributions to the Botanical Check List," published in *Memoirs of the Torrey Botanical Club*, Vol. 5, December, 1893, to December, 1894.

14. "On the Fedias of the eastern United States."—*American Naturalist*, VI, p. 386.

15. "On Stachys cordata, Riddell."—*Botanical Gazette*, I : 25, May, 1876.

16. "On a new Plum. Prunus Allegheniensis, Porter."—*Botanical Gazette*, II : 85, March, 1877.

17. "On Variations of Podophyllum peltatum L."—*Botanical Gazette*, II : 117, July, 1877.

18. "Review of the Sixth Edition of Gray's Manual (revised by Watson and Coulter)."—*Bulletin Torrey Club*, XVII, pp. 67–73.

19. "Solidago humilis and its eastern Allies."—*Bulletin Torrey Club* (with plates), XX : 207. (1893.)

20. "Vitality of the Seeds of Datura Tatula."—*Botanical Gazette*, III–IV : 49.

21. "The Yellow Snow."—*Botanical Gazette*, III–IV : 154.

22. "Viola tricolor var. arvensis."—*Botanical Gazette*, V–VI : 13.

23. "Habenaria Garberi n. sp."—*Botanical Gazette*, V–VI : 135.

24. "Audibertia Vaseyi n. sp."—*Botanical Gazette*, V–VI : 207.

25. "Astragalus mollissimus."—*Botanical Gazette*, VII–VIII : 76.

26. "J. R. Lowrie."—*Botanical Gazette*, XI : 64.

27. "Two new Florida Plants."—*Botanical Gazette*, XIII : 8. (?)

28. "Additions to our Native Flora."—*Torrey Bulletin*, XVI : 24.

29. "Gentiana alba."—*Torrey Bulletin*, XVI : 53.

30. "Aster cordifolius and two new Varieties."—*Torrey Bulletin*, XVI : 67.

31. "Notes on Two Rhododendrons."—*Torrey Bulletin*, XVI : 220.

32. "Notes on Harfordia, Greene and Parry."—*Torrey Bulletin*, XVI : 277.

33. "New Varieties of well-known Species." — *Torrey Bulletin*, XVII : 15.

34. "A new North American Aster, Aster Torreyi."—*Torrey Bulletin*, XVII : 37.

35. "A new Fern for North America."—*Torrey Bulletin*, XVII : 215.

36. "A Botanical Trip into Northern New Jersey."—*Torrey Bulletin*, XI : 90.

37. "Notes from Pennsylvania."—*Torrey Bulletin*, XVIII : 85.

38. "A new Liatris from North Carolina." — *Torrey Bulletin*, XVIII, 147.

39. "Lespedeza striata (Thunb.) Hook and Arn."—*Torrey Bulletin*, XVIII : 306.

40. "Ballast Plants at South Bethlehem, Pennsylvania."—*Torrey Bulletin*, XIX : 9.

41. "Some Additions to our eastern Flora." — *Torrey Bulletin*, XIX : 128.

42. "Aster leiophyllus, n. sp."—*Torrey Bulletin*, XX : 254.

43. "Notes on Plants of our eastern Flora." — *Torrey Bulletin*, XXI : 120.

44. "Scutellaria resinosa."—*Torrey Bulletin*, XXI : 177.

45. "Prunus Allegheniensis."—*Garden and Forest*, III : 428.

46. "The Table Mountain Pine (Pinus pungens)."—*Garden and Forest*, VI : 204.

47. "Magnolia glauca."—*Garden and Forest*, VII : 398.

JOSEPH WALTON.

Joseph Walton was born in Philadelphia in 1823, and in the thirteenth year of his age was sent to Westtown Boarding-school in Chester County, Pennsylvania. Here he imbibed some of the fondness for botany, which characterized the intellectual atmosphere of the institution. The school was located on a tract of 600 acres, a part of which was traversed by the east branch of Chester Creek. A large part was covered with woodland, and there was much diversity in the surface features—hill and valley, swamp

and upland alternating, and furnishing a large variety of plants. Among these were several of the orchidaceous plants, such as *Orchis spectabilis, Habenaria grandiflora, Cypripedium pubescens,* etc.; of these, the *Habenaria grandiflora* is no longer an inhabitant of the farm, the springy swamp in which it grew having been drained and brought into cultivation. As an illustration of the number of species which grew on the Westtown farm, he once collected a herbarium of such flowering plants as were found on that area, including ferns, and it numbered 600 species, although his knowledge of grasses, Cyperaceæ, was quite imperfect. Within easy reach of the school were outcrops of serpentine, and the belt of hydro-mica schists to the south of the great limestone valleys, which added considerably to the botanical riches of that section of country.

In those days Joseph Walton was far more of a collector than a student, but he believes no one can enthusiastically collect objects of any kind, without acquiring at the same time a considerable amount of knowledge respecting them.

After leaving Westtown, he entered Haverford School (now College). During his three years' residence there, he contracted an intimate friendship with Edward Tatnall, of Wilmington, Delaware, whose tastes were similar to his own, and together they scoured the adjacent territory in pursuit of specimens.

On leaving Haverford in the fall of 1836, he was employed at Westtown as one of the teachers, and continued there for ten years. During this period his botanical studies were still continued. He left Westtown in 1846, and after about one year's interval, entered into business in Philadelphia. Very little botanical progress was made at this time, except as he occasionally met with some inter-

esting botanical novelty, as when in visiting Trenton Falls, New York, he wandered into a swampy piece of woodland and came upon a patch of perhaps 100 plants of the beautiful *Cypripedium spectabile* in full bloom. The sight awakened a strong feeling of enthusiasm.

After removing to New Jersey and retiring from active business, Joseph Walton came within reach of the pine barrens, where many new forms of vegetable life re-kindled some of his youthful interest, and he again began to collect material for an herbarium, but these latter collections have been given to a reading-room in the village where he lives.

His principal botanical work, if such it may be called, has been the preparation of a number of natural history articles, mostly descriptive of excursions after flowers, and notices of the plants collected. These have been published from time to time in *The Friend*, a weekly periodical, published in Philadelphia.

GEORGE W. FAHNESTOCK.

George W. Fahnestock, a member of the Academy of Natural Sciences and the Pennsylvania Horticultural Society, was a botanist of local repute. A paper of his, entitled "Memoranda of the Effects of Carburetted Hydrogen Gas on a Collection of Exotic Plants," published in the *Proceedings of the Academy of Natural Sciences*, for May, 1858, is of merit as recording his observations on the comparative injury done to greenhouse plants exposed to the gas during the winter of 1857, when the earth was frozen to an unusual depth, three feet or more. The plants are arranged serially in the paper according to Lindley's system, and the effect noted.

JOSIAH GREGG.

Practically nothing is known of the early life of Josiah Gregg.* A broken down constitution first made him a traveler on the prairies, which he afterwards crossed several times as a trader in the employ of Mr. Thomas G. Rockhill, a Philadelphia merchant. He contributed a series of letters on the history and condition of the Santa Fe trade to the Galveston *Advertiser* (1841 and 1842), and the Arkansas *Intelligencer;* "The Commerce of the Prairies," a journal of a Santa Fe trader during eight journeys across the great western prairies, and a residence of nearly nine years in New Mexico, was written in 1844. During a residence in New Mexico, Gregg devoted some attention to botany and discovered several new plants. *Greggia*, a genus of cruciferous herbs of western Texas and northern Mexico, was dedicated to him by Asa Gray, as also *Fraxinus Greggii.* In 1840 Gregg acted as guide to General Wool's division to Chihuahua, and later he went to Saltillo with General Butler. He is supposed to have died in California, in 1850.

GAVIN WATSON.

Gavin Watson, M. D., was a Scotchman and active practitioner in the upper part of the City of Philadelphia. He devoted himself actively to the collecting of plants in surrounding country. He was held with disfavor by contemporary local botanists, because he, with great disregard to the botanists' code of honor, destroyed the localities of several rare plants by digging them up for

* SARGENT. *Silva of North America*, VI : 33.
Proceedings American Academy, XII : 63 (1876).
Garden and Forest, VII : 12.

sale and for herbarium exchanges. He was Secretary of the Pennsylvania Horticultural Society and a member of the Academy of Natural Sciences. He died November 1, ——.*

H. DETWILER.

H. Detwiler, M. D., of Easton, Pennsylvania, now deceased, collected largely years ago around Hellertown, and sent his plants to Europe. Some of his plants are found in the great Meissner Herbarium of Columbia College.

EDWIN FUSSELL.

Edwin Fussell, M. D., was born in Chester County, Pennsylvania, and was a friend of Joshua Hoopes. He was an enthusiastic botanist, influencing the younger generation. He died in Media in 1880.

GEORGE MARTIN.

Dr. George Martin † was born near Claymont, Delaware County, Pennsylvania, in 1826, and received his early education at the Westtown Friends' School, after which he became a student at the University of Pennsylvania, where he graduated in medicine about 1847. He first practiced his profession at Concordville, Delaware County, where he remained about three years. Owing to delicate health he next became connected with the Fifth Street Dispensary, in which he remained some five years, at the expiration of which time he engaged with his cousin, John M. Sharpless, in the latter's chrome works in the City of Chester. During

* *The Gardener's Monthly* (Meehan), I, p. 11.

† *Journal of Mycology*, II: 137. Signed J. B. E. (J. B. Ellis).

the war he was connected with soldiers' hospitals in Chester, in which he rendered efficient and untiring services. In 1866 he went to West Chester, where he continued to live until the time of his death. During the last eight or ten years of his life his health was such as to lead him and his wife to pass the winter season in Florida. At the time of his death, which occurred at his home in West Chester, October 28, 1886, he was one of the managers of the Pennsylvania Training School at Media, and a member of the Chester County Medical Society and of the College of Physicians of Philadelphia. Beginning with 1878, Dr. Martin devoted much time to mycological studies, especially to the examination of the parasitic leaf fungi, and only a few days before his death had completed a "Synopsis of the North American Species of Septoria," as a continuation of the series of mycological papers he had already contributed.

In his demise the medical profession loses one of its shining lights. In scientific pursuits he was also a close and earnest student, as well as a botanist of such note as to lead him into close association with the leading botanists of the day. Dr. Martin was a genial and good citizen. Plain and retiring in his manners, he was beloved by all and honored at home and abroad.

Bibliography.

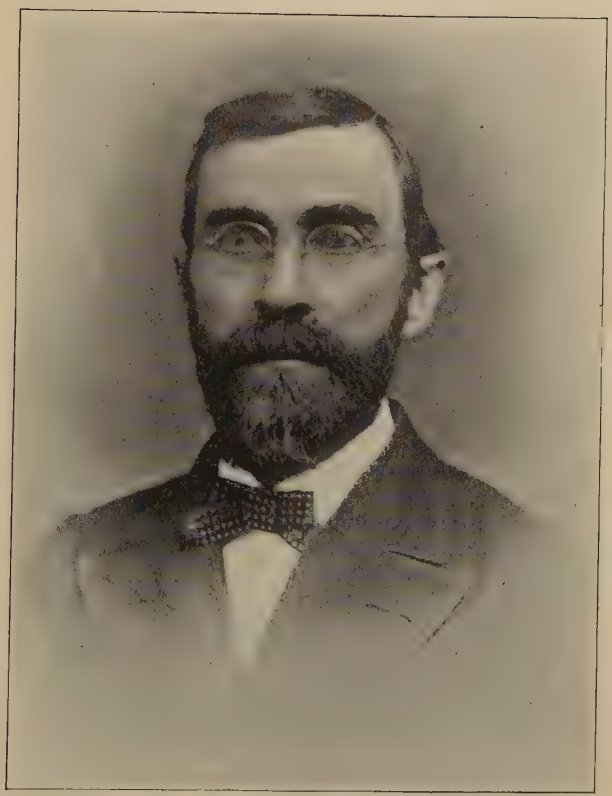
1. "New Florida Fungi."—*Journal of Mycology*, I : 97.

2. "Synopsis of the North American Species of Asterina, Dimerosporium and Meliola."—*Journal of Mycology*, I : 133, 145.

3. "New Fungi."—*Journal of Mycology*, II : 128.

4. "The Phyllostictas of North America."— *Journal of Mycology*, II : 13, 25.

5. "Enumeration and Description of the Septorias of North America."—*Journal of Mycology*, III : 37, 49, 73, 84.



GEORGE MARTIN.

UNIVERSITY OF ARIZONA

THOMAS MEEHAN.

Thomas Meehan was born March 26, 1826, at Potter's Bar, near Barnet (Hertford, Middlesex), England, not far from London. His father, Edward, was one of the most skillful private gardeners of England. His mother, Sarah Daneham, came of one of the oldest Saxon farming families. The family was in the deepest poverty at the time of the birth of Thomas, who was instructed by his mother until he was twelve years of age, when he was put to work with a gardener. He inherited his love for plants from his father, and being deaf from birth, he never mingled with other boys, but spent his time in the fields as an amateur naturalist. Some of his early observations were remarkable, and attracted the attention of well-known men, who befriended him. His first article was published when he was thirteen years years of age, and about the same time he succeeded in hybridizing the Fuchsia, for the first time producing a race which he named St. Clair. When fifteen years of age he made and published his first scientific discovery on the lines which afterward made him famous—"Irritable Stamens in the Flowers of Portulaca grandiflora"—then a new introduction from Mexico. He attracted the attention, through his diligence in the pursuit of botany, of such men as Dr. Broomfield, Dr. Thomas Belsatter, Professor C. C. Babbington, and others. His spare time, while watching by night the stoke-holes of the greenhouses, was spent in study. At seventeen he became head-gardener to a Mr. Vaux, and in 1845, leaving his position, he entered the Royal Gardens at Kew, where he became acquainted with Robinson Scott. He fell under suspicion as belonging to the Chartists, and thus formed the ill-will of Sir

William Hooker, Director of the Gardens, who subjected him to petty annoyances. Mr. Meehan refused to leave the gardens unless he received a certificate. Having obtained it the following year, he came to the United States (March 1, 1848), sailing on a vessel named "The Devonshire." He reached America on March 21st, on his twenty-second birthday, with twenty-five dollars in his pocket, traveling to Philadelphia by canal boat. He secured a position at the nurseries of Robert Buist on Darby Road, where he remained for one year, afterwards working for Andrew Eastwick, under whose supervision he laid out and restored Bartram's Garden. Leaving the employ of Eastwick, he worked for Caleb Cope, at Holmesburg, where he remained until 1853. In 1852 he married Catherine Colflesh, and after the birth of a son, started a nursery business of his own at Ambler, with a branch nursery at Germantown, with William Saunders as partner. During the War of the Rebellion Mr. Meehan lost nearly everything; subsequently he entered into partnership with a certain Wandell, under the business name of Meehan & Wandell. This partnership was eventually dissolved, Mr. Meehan taking the entire responsibility of the business, which grew rapidly, until seventy-five acres were cultivated at Germantown.

In March, 1860, he was elected a member of the Academy of Natural Sciences, in which body he has taken an active interest ever since. He was elected Vice-President after a hot fight. He is one of the oldest members of the American Association for the Advancement of Science, and is also a member of various learned societies, notably among which may be mentioned: The American Philosophical Society, the Pennsylvania Historical Society, the Pennsylvania Horticultural Society, and other scientific

societies, both at home and abroad. Mr. Meehan was elected a member of the Royal Wernerian Society in 1844. He has been for many years Corresponding Secretary of the Pennsylvania Horticultural Society, and an honorary member of most of the leading Horticultural Societies of America and of the Royal Horticultural Society of London. For several successive years Professor Meehan was elected annually to the Board of Visitors of Harvard University. When the Philadelphia Economic Museum was originated in 1894, he became one of the Trustees. When the State Board of Agriculture was formed Mr. Meehan became the State Botanist, a position which he still retains.

About 1853 Mr. Brinklaw started *The Gardener's Monthly*, Mr. Meehan assuming the editorship until the death of Mr. Charles Marot (circa 1881). He also was for a time Editor of the Agricultural Department of the *Philadelphia Press*, under the management of John W. Forney. Mr. Meehan also became Horticultural and Agricultural Editor of a number of American journals, at one time contributing to no less than six, viz.: *Maryland Farmer*, *New York Independent*, *New York Tribune*, and *Public Ledger*. While at Bartram's Garden he published a book: "Handbook of Ornamental Trees,"* which was well received. Mr. Meehan was the author of the descriptions which appeared with the lithographic-colored plates of plants, issued by Prang, of Boston, as "The Flowers and Ferns of the United States," † which were published until the death of

* *The American Hand-book of Ornamental Trees.* By Thomas Meehan, gardener. Philadelphia: Lippincott, Grambo & Co.. 1853, octavo, pp. xv, 257.

† *The Native Flowers and Ferns of the United States, in their Botanical, Horticultural and Popular Aspects.* By Thomas Meehan. Illustrated by chromo-lithographs. Boston: L. Prang & Co., 8 vo. I (1878), II (1879). Series 2. I (1880), American Natural History Publishing Co., Limited, Philadelphia. II (1880), Charles Robson & Co., Philadelphia.

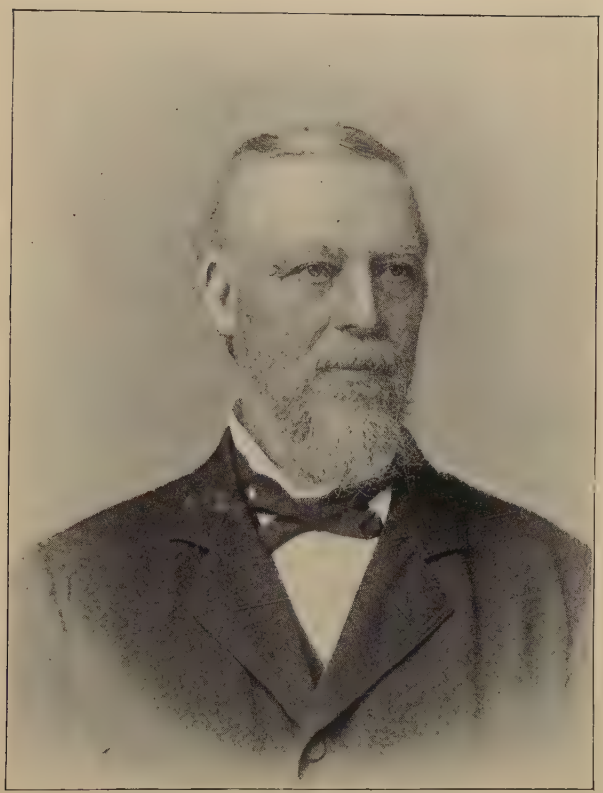
Mr. Robson, when their issuance ceased. Their publication was resumed when Thomas Meehan and younger sons established "Meehan's Monthly," in 1890.*

Thomas Meehan's career as a public man began in war time, when he was joined with a number of prominent men in an endeavor to compromise with the South. He was also instrumental, with others, in the drawing up of the rough draft of the Crittenden Resolutions. In 1876 he was elected a member of the School Board of Germantown. In 1880, at the demand of the Independent Republicans, he consented to stand for Common Councils on the Republican ticket. Through his endeavors, in ten years Germantown, from being traversed by dirt streets, became one of the best paved portions of the city. Mr. Meehan also secured the passage of an ordinance requiring that public school-houses be built of two stories.

One of his first movements as Councilman was to introduce an ordinance to select unimproved plots over the whole city, a few miles apart, leaving them to grow in value, and then sell outlying portions, in order to pay for the parks.† This plan was pronounced illegal by the City Solicitor, the charter of Philadelphia forbidding it to sell real estate. A plan to raise a loan for purchasing the plots was also found to be impracticable, the debt of the city having already reached the limit allowed by law. The only method left was to put such plots on the plan as were not likely to be pushed for purchase for a number of years, so that they could be taken gradually as the annual income of the city permitted.

* *Meehan's Monthly, Devoted to General Gardening and Wild Flowers.* Conducted by Thomas Meehan. Published by Thomas Meehan & Sons, Germantown, Philadelphia.

† *Garden and Forest*, VI: 248.



THOMAS MEEHAN.

UNIVERSITY OF ARIZONA
LIBRARY

Bartram Garden, the first inspiring thought in the movement, was, naturally, the first park taken. Stenton Park, the estate of Logan, the Secretary of the Commonwealth under Penn, himself a great botanist, as the natural order *Loganiaceæ* so well commemorates, was next placed on the plan. Then followed Stouton, Juniata, Frankford, Waterview, Treaty Elm—the spot on which Penn made his celebrated treaty with the Indians—John Dickinson, Wharton, Mifflin, Harrowgate—the site of the famous Harrowgate Springs—Vernon, Womrath, Ontario, Pleasant Hill, Fotterall, Weccacoe and Starr Gardens.

Next to Bartram Garden, the crowning success of the whole movement, so largely due to Mr. Meehan's efforts, is Vernon Park, a tract of twelve acres in Germantown. Although recently in the family of the Wisters, it was originally laid out and planned by Meng, one of the early settlers in Germantown, a wealthy banker and a lover of rare plants. Under his patronage Kin, an early botanical explorer, traveled.

It was largely Mr. Meehan's influence in Councils which procured an appropriation to secure the exhibits at the World's Fair, and which were later incorporated by Act of Councils, approved by the Mayor, June 15, 1894, into the Philadelphia Museums. Mr. Meehan has been the constant friend of the institution, since its inception, in procuring necessary legislation.

Professor Meehan, as a scientific man, has corresponded with most of the scientists of prominence in both Europe and America. A close correspondence was maintained with Charles Darwin, who relied on Mr. Meehan's obser-

vations for many of the facts incorporated in his books. This correspondence continued, until a slight misunderstanding between them finally put a stop to their letter-writing and pleasant intercourse. Mr. Darwin gives credit to Meehan's acute observations in many places in his epoch-making works. Rev. Mr. Henslow also drew upon Mr. Meehan's mint of information concerning plants in general, in the preparation of his book, "Origin of Floral Structures." Mr. Meehan's entire attention is not directed to the publication of scientific papers, but part of his time is given to experimenting, testing, observing, and collecting. Many of his observations lack the force which a perusal of the literature of the subject would give them. His published contributions to botany are numbered by the hundreds. It would be impossible in the limits imposed upon this book to enumerate his papers on botanical subjects. Mr. Meehan's views have been antagonized many times by botanists who have not leaned to his way of thinking, but they all acknowledge his worth as a man, his untiring public spirit, his wide philanthrophy, his kind heart and pleasant ways. A man of powerful build and a distinguished presence, Mr. Meehan has left his mark in the fields of legislation and science.

A trip to Meehan's nursery in Germantown well repays a lover of trees.* In no other place are American trees and shrubs raised in such quantities. Mr. Meehan early recognized that eastern America is particularly suited for deciduous-leaved plants, and that American plants are the best for America. The senior member of the firm has been

*1893. *Garden and Forest*, VI: 377.

busy for years raising American oaks, maples, ashes, dogwoods and scores of other plants. *Cornus florida*, one of the finest of all hardy flowering trees, is raised by thousands. Trees not often seen in nurseries, like the tupelo, sassafras, persimmon and sycamore are here in numbers, as are the magnolias and the tulip tree. But the nursery is not only noted for the cultivation of American plants; many exotic species are cultivated on a large scale, and it is certainly true that the stock of young plants of the beautiful Japanese *Viburnum plicatum* is larger than can be found in all other American and European nurseries combined.

The Germantown nurseries contain a number of remarkable and interesting botanical specimens. Here is the original of the well-known weeping dogwood, *Cornus florida*, found in woods near Baltimore, and the original plant of *Halesia Meehani*, a chance seedling raised by Mr. Meehan.* There are here also a small specimen of a weeping variety of *Prunus serotina* and a fastigiate tree of *Picea Engelmanni*, produced from a graft brought by Mr. Meehan from the timber-line on Gray's Peak in Colorado.

One of the best plants in the United States or Europe of the Japanese and northern China, *Quercus dentata*, can be seen in this garden, thirty feet high, with a stout, well-formed trunk and spreading branches. The hardiness of this handsome tree in the neighborhood of Philadelphia appears to be demonstrated. Here, too, is a fine specimen of *Cedrela Sinensis*, nearly thirty feet high. Near the cedrela flourishes one of the best specimens of *Hovenia dulcis*, which can be seen outside of Japan. There grows a large specimen,

* *Garden and Forest*, V : 535, figure.

too, of *Zizyphus vulgaris*, the Jujube tree; this beautiful tree, a native also of Northern China, appears perfectly hardy in Germantown. A remarkable plant of *Pterostyrax hispidum* is more than twenty-five feet high, with a tall, straight trunk and wide-spreading branches.

The great-leaved Oregon maple, *Acer macrophyllum*, is represented by three handsome specimens, twenty to thirty feet high, covered with dark green leaves. Two large plants of a weeping form of *Ulmus Americana*, found near Galena, in Illinois, show the value of this variety as an ornamental tree. Of the flowering trees in the nursery nothing is so beautiful as *Gordonia Altamaha*, the rarest of all North American trees. Mr. Meehan raises it extensively, fully appreciating its value and the beauty of its large, fragrant white flowers, which resemble those of a single-flowered Camellia, and of its large leaves which in autumn assume the most brilliant scarlet tints.

Among the conifers are two of much interest; one of these, *Retinospora squarrosa*, a plant which deceived such a good botanist as Maximowicz, who considered it a species, but which here has entirely grown out of its juvenile squarrose-leaved form, with the exception of two lower branches, and displaying its true character, showing that it is only a juvenile form of *Retinospora pisifera*. The second is the so-called *Retinospora ericoides* which, growing into its mature form, shows that this plant is only a young state of the common arbor-vitæ (*Thuya occidentalis*). The ground, although devoted as a nursery to commercial purposes, is also a respectable botanical garden, presided over by a botanist of great experience and insight.

JOHN GIBBONS HUNT.

John Gibbons Hunt, M. D., was born July 27, 1826, and was for a long time an intimate associate of Joseph Zentmayer in microscopy. Like Zentmayer, Dr. Hunt was not a prolific writer, although he contributed a number of short articles to the *Cincinnati Medical News*, and some minor periodicals. As a manipulator of the microscope and preparer of objects he was unsurpassed, but he looked on this skill as only the means to an end—a knowledge of the objects themselves. Having made himself familiar with animal histology, he very early turned his attention to the anatomy of plants of which he acquired an intimate acquaintance. He was one of the very first to apply to plants the methods of staining that were in use for animal tissues, having begun before 1850. In 1853 he first commenced double staining vegetal tissues, by methods afterwards published by Dr. Beatty, of Baltimore, whose articles were widely quoted in the journals of this country and Europe. In 1850 he graduated from the Medical Department of the University of Pennsylvania, and became a member of the Academy of Natural Sciences in July, 1858, and of the College of Physicians in May, 1884.

It was as a teacher that Dr. Hunt exercised his greatest influence. A practicing physician for many years in Philadelphia, he still found time to give a great deal of attention to instructing medical students and others in the use and care of the microscope and in the preparation of microscopic slides and objects. He was Professor of Histology in the Woman's Medical College for a number of years.

Founder of the Biological and Microscopical Section of the Academy of Natural Sciences, and Conservator from

1872 to 1880, Professor Hunt did much good work. He was the first professor appointed under the by-laws of the Academy to the chair of histology and microscopic technology, and although master of the most refined technique, he never received a large share of popular recognition on account of his native modesty and reserve.

JAMES DARRACH.

James Darrach was born in Philadelphia, December 8, 1828, the son of Dr. William Darrach, a descendant of William Bradford, the first printer in Pennsylvania, and the founder of the first newspaper in New York, and Margaret Monro, descended from Colonel Haslitt, who fell at the battle of Princeton. He was educated at the University of Pennsylvania, from which he received the degree of A. B. in 1849, and that of M. D. in 1852, having spent a part of the interval in his father's office. He settled first in Philadelphia, where he resided till 1861, when he removed to Germantown. After graduating he studied analytical chemistry in Booth's Laboratory, for six or nine months. He was connected with the Pennsylvania Hospital as resident for three months and as surgeon for eighteen months, including the period of what is known as the yellow fever epidemic of 1854.

He delivered a course of lectures on the practice of medicine in the Philadelphia Medical School, and was Lecturer on Materia Medica in the Philadelphia School of Medicine until it dissolved. He was Assistant Demonstrator of Anatomy and Clinical Assistant in the University of Pennsylvania for four years. He is a member of the Philadelphia County Medical Society, of the College of Physi-

cians, of the Pathological Society, and of the Academy of Natural Sciences. The transactions of some, if not of all of these societies, have been enriched by contributions from his pen. During the late war he established the Cuyler Hospital, at Germantown, of which he was one of the surgeons in charge. Dr. Darrach married Sarah Morris, granddaughter of Robert Morris, the financier of the Revolution.

With Dr. Darrach botany has always been a side issue, having first begun its study because in need of out-door exercise. At the suggestion of Dr. Joseph Leidy, Dr. Darrach made a careful study of our local flora, in connection with Dr. Leidy, Charles E. Smith and Aubrey Smith, publishing the result of his researches and collections in the *Proceedings of the Academy of Natural Sciences* for 1853, and later in a pamphlet, entitled "Plants Appearing in Flower in the Neighborhood of Philadelphia, from February to November." Printed in 1882.

JOB B. ELLIS.

The subject of the present sketch * was born at Potsdam, New York, January 21, 1829. He evinced a remarkable fondness for study at an early age, and the time not spent at school or at work on his father's farm, was devoted to reading. At the age of sixteen he taught the winter school at Stockholm, St. Lawrence County. Here the lad received for his services ten dollars a month and "boarded around." Five of the ten dollars was paid in cash, the other five was to be paid in grain. It was just twenty years afterward when the last of the grain was turned over to him. Having

* From the *Botanical Gazette*, vol. XV., No. 11, p. 299. F. W. Anderson, 1890.

completed his academical course he entered Union College at Schenectady, New York, in the fall of 1849. By the end of the term his funds were exhausted, and he had to seek employment for the winter. So, in company with A. B. Smith, now a successful lawyer of Poughkeepsie, New York, he started afoot to Saratoga County to find a school to teach. After walking for some miles they came to where the road forked in the midst of a dense pine wood. Not knowing which fork to take, a stick was set up on one end and allowed to fall. It fell towards the right-hand fork, which the young men followed, and soon came to the village of Charlton. Here Mr. Ellis got a school, while Smith went on to Galway, the next village, and, fortunately, got the school there. In June, 1851, Mr. Ellis graduated from Union College with the degree of A. B. (since advanced to A. M.), and went to Germantown, Pennsylvania, into a select school with the Rev. D. Washburne.

He had studied botany a little at college, but it was here that he commenced to take an active interest in phanerogamic botany, little dreaming what the outcome would be. The earliest plants he remembers collecting were *Liparis liliifolia* and *Lygodium palmatum*. In November, 1851, he severed his connection with the school and entered the Albany Academy as classical tutor, remaining one year. This position was better suited to his taste, for he had decided to become a professional teacher of classics. George H. Cook, recently deceased, State Geologist of New Jersey, was Principal of the Academy. The evenings were spent making blow-pipe analyses of minerals with G. W. Taylor, a fellow-tutor. The following year he and Taylor went into a select school together for three months, but as it did not pay, the

JOB B. ELLIS.

UNIVERSITY OF ARIZONA
LIBRARY

school was broken up, and Mr. Ellis returned to Potsdam. While with Taylor he saw by chance a notice of Ravenel's Fungi Caroliniani Exsiccati, the first thing of the kind ever issued in America. While at college he had frequently noticed the agarics, but not knowing where to get books or information concerning fungi, he let them alone. But upon seeing the notice of Ravenel's collection, he wrote to him and then commenced a correspondence (in 1857), interrupted only by the war, which lasted till Ravenel's death. He continued collecting phanerogams until 1870, at the same time giving gradually more and more attention to fungi. In 1870 he sold his phanerogamic collection, containing about 1000 species, to St. Lawrence University, Canton, New York.

In May, 1853, he moved to Poughkeepsie, entering a Mr. Bartlett's boarding-school as classical teacher, and stayed two years. While there he and Professor Buckhout, now of State College, Centre County, Pennsylvania, collected plants on Saturday, and, said he: "On Sundays, too, if we could steal away, for Mr. Bartlett was very pious." In February, 1855, in company with his sister, Mrs. L. B. Doud, late of Plattsmouth, Nebraska, he left Poughkeepsie for Charleston, South Carolina, with the intention of teaching school there. He called on one of the professors in the South Carolina College to seek information on the subject. Said he: "I told him that I had come South to teach and make a home there. He at once asked me whence I came, and when I answered from New York, he replied, while slowly swinging in his revolving office chair, 'Well, the state of feeling between the North and South is such that I doubt very much whether you will succeed.'" And he

didn't. From Charleston he and his sister went to Alexander, near Augusta, Georgia. Here he succeeded in obtaining a position in an academy, and taught one term. One morning he went to the class-room and found a huge living snake writhing about in the big open fire-place, suspended by a stout string, tied tightly about its middle, and hanging from a hook in the chimney, where the boys had placed it for fun. He returned to Potsdam, and on the 19th of April, 1856, an event took place which made it possible for him to do the enormous and valuable work he has since done for American mycology. This was his marriage to Miss Arvilla J. Bacon, who has been a faithful partner in all the vicissitudes of life, and a constant and painstaking assistant in his mycological work for the past thirty-four years.

In the fall of 1856 he became Principal of Canton Academy. In 1863 Mr. Ellis connected himself with one of the public schools in Potsdam village. He was engaged there until September, 1864, when he entered the United States Navy at Brooklyn, New York, and spent the winter of 1864–5 on a United States steam-frigate of the North Atlantic Blockading Squadron. He was present at the bombardment of Fort Fisher, three days in December, 1864, and three days in January, 1865, when the fort was taken. While on the war-ship he became acquainted with a man named Hale from New Jersey, who told him of the good climate in the vicinity of Newfield. At the close of the War, in the spring of 1865, Mr. Ellis once more returned to his native town (which he has visited but once since), and removed his worldly possessions to Newfield, New Jersey, where he has continuously lived, twenty-five years having

been spent under the present roof. Since living there he has been engaged in a variety of pursuits.

In 1878, he dropped every thing else and commenced to devote his whole time to fungi, desiring to disseminate more widely a knowledge of North American fungi and to arouse home botanists, if possible, from their apathetic indifference towards these plants. He decided to begin in a modest way by issuing ten sets of New Jersey fungi, under the title of "Fungi Nova-Cæsarienses." He put up ten centuries on sheets of paper in boxes. Of the two sets sold one went to Dr. Farlow, the other to Mr. Isaac C. Martindale. About this time Mr. Ellis went to see the latter gentleman, who asked, "Why not call it N. A. F."? Mr. Ellis seeing the greater appropriateness and scope of such a title recalled the two sets and concluded to get out a series of centuries in bound volumes, entitled, "North American Fungi." At that time he was so pressed for means that he had not money enough to get the books made for the first two centuries. Thereupon, Prof. Farlow, who favored the scheme, had the books made in Boston and advanced them to Mr. Ellis, who paid for them as soon as he was able. The centuries took well from the start, and from thirty-five sets to begin with the demand rapidly increased up to fifty-three sets, which number of copies has been issued regularly for the past five or six years. Altogether thirty-six centuries have been issued. In all this great undertaking, as well as in others which might be mentioned, the cheerful interest and practical helpfulness of Mrs. Ellis has been constantly apparent. She has made and bound all the books except the first sixty, which Dr. Farlow kindly advanced for his friend at the beginning.

Nearly all of the specimens have been cleaned, sorted, put into neat pockets, labeled and fastened into the books by her own hands. Mr. Ellis himself says, that owing to his great correspondence and the enormously burdendsome quantity of material constantly being sent to him for determination and comparison, he would not have been able to get out the "N. A. F." without her valuable aid.

From 1876 to 1879, not having at that time the books and exsiccati collections necessary for independent work, many specimens were sent to Dr. M. C. Cooke, who determined and published them in *Grevillea*. Under the circumstances then existing this course seemed necessary, though it called out some adverse criticism at the time.

Since 1880 Mr. Ellis has been associated with Mr. Benjamin M. Everhart, who has freely placed at his friend's disposal his splendid botanical library and extensive mycological collections, and to his aid and counsel Mr. Ellis feels greatly indebted.

In July, 1878, Mr. Ellis was elected a corresponding member of the Academy of Natural Sciences of Philadelphia. In August, 1882, he was elected a corresponding member of the Cryptogamic Society of Scotland, and in December of the same year was elected corresponding member of "Die Kaiserlich-Königliche Zoologisch-Botanische Gesellschaft in Wien."

Mr. Ellis leads a quiet and retired life well suited to his studious, sensitive nature. Although he moved about considerably in his younger days, he was always fond of home, as can be plainly seen from his invariable return to Potsdam, his native town, after every venture into the outer world. Too much excitement of any kind affects him

painfully even now. With considerable quiet humor he tells how that when he was teaching in Mr. Bartlett's school he determined on three different occasions to go down on the boat to New York and stay there several days to "do the city," and each time returned home on the first train he could get, suffering with a violent headache caused by the excitement of the trip and the noisy bustle of the city. His fellow-botanists feel his influence and recognize the value of his work, but wonder why they never see his kindly face at any of the botanical meetings of the country. It is simply because his health, at all times precarious, demands constant quietude coupled with strict simplicity and regularity in his daily life. A thorough scholar and quite a linguist, he is perfectly familiar with Latin, Greek, German and French, and has also a good practical knowledge of Polish, Swedish, Italian and Spanish.

What Asa Gray was to American phanerogamic botany, Job B. Ellis is to American mycology. He has published besides numerous other papers on mycology, a manual of North American Pyrenomycetes * which has given a great impetus to the study of fungi in this country. Despite a checkered and toilsome life in past years, often in financial straits, and always burdened with delicate health, he has probably done more than any other man in America to advance the knowledge of our native fungi and to stimulate the ardor of every student of mycology.

The collection of fungi, made by Mr. Ellis, represents the net results of over forty years continued work in collecting, determining and arranging the different species

* *The North American Pyrenomycetes. A Contribution to Mycologic Botany.* By J. B Ellis and B. M. Everhart, with original illustrations by F. W. Anderson. Newfield, New Jersey, 1892. Octavo, 793 pp., tab. 41.

of North American Fungi, and contains specimens of the majority of the species found in this country, including many of the species published by De Schweinitz, as well as a large part of those collected by Curtis and Ravenel, and type specimens of all the species published by J. B. Ellis, either alone or in connection with others (Cooke, Everhart, Martin, Kellermann, Langlois, Holway, Dearness and Galloway), many hundreds of new species, the most of which are not found in any other collection. On account of the more general interest now felt in the study of mycology, specimens have been sent for determination from all parts of the country, from Alaska to Texas and Florida, and from Maine to California, so that the collection contains a greater variety of forms than any previously made here. Among the collectors who have contributed specimens are Dr. H. W. Ravenel, of South Carolina; Dr. John Macoun, Botanist of the Canadian Geological and Natural Historical Survey; Mr. John Dearness, County School Superintendent, London, Canada; Rev. F. D. Kelsey, F. W. Anderson, and Mr. and Mrs. H. M. Fitch, of Montana; the late William C. Carpenter, from Oregon; W. N. Suksdorf, from Washington; Dr. H. W. Harkness, from California; Mr. T. D. A. Cockerell, from Colorado; Dr. W. A. Kellermann, from Kansas; Rev. C. H. Demetrio and Dr. B. T. Galloway, from Missouri; Rev. A. B. Langlois, from Louisiana; Professor S. M. Tracy, from Mississippi; Dr. George Martin and Colonel W. W. Calkins, from Florida; Mr. Commons, from Delaware; Mr. Benjamin M. Everhart, from Pennsylvania; Professor C. H. Peck, from New York State; E. W. D. Holway, from Iowa, and various others from other parts of the country. Besides the North American species, the

Herbarium contains about 500 species collected by Spegazzini and Balansa in South America, and 200 or more from Messrs. Patouillard and Gaillard, collected by the latter in the Orinoco country and Venezuela.

Important collections have also been sent from Sierra Leone, on the west coast of Africa, by the Rev. J. Augustus Cole. Many valuable specimens, especially of the larger fungi, from various parts of the world, mostly from India and Australia, have been received from Dr. M. C. Cooke, of London. All this material, together with the extensive collections made around Newfield, New Jersey, is arranged in 150 quarto volumes of the same style as the North American Fungi and in 100 tin cans and wooden boxes, the latter 12 x 10 x 6 inches, with hinges and clasps for fastening; the tin cans being 10 inches high and 8¼ inches in diameter, with close-fitting covers, so as to make the contents safe from the depredations of insects. Of the regular exsiccati, the Herbarium contains:

1. North American Fungi, 36 volumes or centuries; each volume containing 100 species of fungi, represented by actual specimens, with printed labels giving name of fungus, locality and host, with name of the collector. Besides the specimens with printed label, this set contains duplicate specimens of many of the species from different localities or on different hosts, with many postal cards and letters from various European and American mycologists, referring to species whose authenticity may have been called in question.

2. Ravenel's Fungi Americani, 800 species, edited by Dr. M. C. Cooke. This collection is valuable, as furnishing authentic specimens of the species described by Dr. Cooke.

3. Ravenel's Fungi Caroliniani Exsiccati, 5 centuries

in bound volumes like the North America Flora. This was issued from 1852 to 1860, and has been out of the market for thirty years. It is valuable as furnishing authentic specimens of many of the species described by Berkeley and Curtis.

4. De Thumen's Fungi Austriaci, centuries 6-12 (1872-1874) containing 600 species of Austrian fungi. The specimens were originally distributed on loose sheets in pasteboard covers, but they have in this and other exsiccati issued in this form, all been arranged in bound volumes like the North American Flora.

5. De Thumen's Mycotheca Universalis, centuries 1-23 (1875-1884). This collection embraces specimens from all parts of the world.

6. Linhart's Hungarian Fungi, complete, 5 centuries (1883-1885).

7. Saccardo's Mycotheca Veneta, centuries 12, 13, 15 and 16 (incomplete). The specimens in these four centuries are on loose sheets in pasteboard covers, as originally issued.

8. Rabenhorst's Fungi Europæi, 1900 numbers (19 centuries), including the continuation, by Winter and Paszchke.

9. Desmazieres, Plantes Cryptogames de France, a complete set of the first edition (1830-1851) lacking only 125 numbers in fascicles I-X. This is a very valuable collection, comprising with four fascicles of edition 2d (1852-1854) 38 complete volumes in the original binding (50 numbers in each volume).

The set in the Ellis Herbarium formerly belonged to the Rev. M. J. Berkeley, and accompanying many of the specimens are drawings by Mr. Berkeley, representing the

spores, and thus adding materially to the value of the set. There is also a complete index to all the species in both editions. As far as known, there is only one other set of this collection in America.

10. Sydow's Mycotheca Marchica, a complete set 43 centuries, containing 3400 numbers. This collection was commenced in 1880, and is still being issued.

11. Sydow's Uredineæ (1889-1892) 12 fascicles, 600 numbers; all that have been issued up to this date (1892). The species in this collection are represented and illustrated by copious specimens, and the collection is considered to be one of the most valuable in this order of Fungi.

12. A collection of about 700 species of Finland Fungi from Dr. P. A. Karsten, Mustiala, Finland. All the different orders of Fungi are represented in this collection, especially the *Thelephoreæ* and *Polyporeæ*, including many of the new species published by Dr. Karsten.

13. Eriksson's Fungi Parasitici Scandinavici Exsiccati, 10 fascicles, 500 numbers (1882-1890). The fascicles are in the original binding, and everything, from the specimens themselves to the finish of the books which contain them, is strictly first-class. The series is not yet complete.

14. Krieger's Fungi Saxonici Exsiccati, 21 fascicles, 1050 numbers (1885-1892), complete as far as issued. A very valuable collection on account of the excellent specimens, which are ample and good.

15. Spegazzini, Hongos Sud Americanos, 5 decades, 50 numbers (1881), representing species of South American Fungi, collected in the Argentine Republic.

16. Fungi Guaranitici, 400 species, collected by Balansa, in Brazil.

17. Cooke's Fungi Britannici, 2d series, 1 century, with specimens of 100 species of British Fungi, each illustrated with a drawing showing the characters of the species.

18. Cooke's Fungi Britannici, 7 centuries, 1st series, complete, containing specimens of 700 species of British Fungi, arranged and named by Dr. M. C. Cooke. The specimens are arranged in 7 volumes, like those used in the North American Fungi.

19. Micro Fungi Britannici, collected, named and prepared by Rev. J. E. Vize, Westpool, England, 5 centuries, with specimens of 500 species of British micro-fungi.

20. L. Romell, Fungi Exsiccati Scandinavici, century 1st, containing specimens of 100 Scandinavian Fungi.

21. I. Funghi Parassiti delle Piante Coltivate od Utili, per cura di Giovanni Briosi and Fridiano Cavara. Nine fascicles, illustrating 225 species of fungi parasitic on cultivated or useful plants. Published at Pavia, Italy, 1888-1892. This is one of the most valuable exsiccati, each species being accompanied by a fine drawing.

22. F. Cavara Fungi Langobardiæ Exsiccati, pugillus I-IV, Pavia, Italy, 1892, containing 200 species of Italian Fungi,

23. Economic Fungi, Seymour and Earle, fascicles I-IV (1890-1892), containing 200 specimens of North American parasitic fungi. The specimens show the different forms of the same species from different localities and on different plants.

24. Kansas Fungi, by Kellerman and Swingle, 2 fascicles, containing specimens of 50 species of Kansas Fungi.

25. Rehm's Ascomycetes, Nos. 1-1050, a complete set of this valuable collection, containing specimens illus-

trating 1050 species of asycomycetous fungi. On account of the bulky character of many of the specimens, this collection is arranged in nine boxes, the specimens, in the order of their numbers, being fastened on heavy sheets of paper and laid in the boxes in such a way as to be readily lifted out to admit of the examination of any particular number. On account of the character of the specimens and the reputation of Dr. Rehm, who issued them, this is one of the most valuable of all exsiccati.

26. Kunze's Fungi Selecti, 5 centuries, containing 500 specimens of fungi, mostly collected around Eisleben, Germany. It is one of the old standard collections, the specimens being arranged in boxes as in Rehm's Ascomycetes.

27. Fendler's Venezuelan Fungi, 100 species, determined by Berkeley. These are from the herbarium of the late Dr. H. W. Ravenel. There are about 100 species of Wright's Cuban Fungi, also determined by Berkeley.

28. Roumeguere's Fungi Gallici, 67 centuries, containing 6700 specimens of Fungi, mostly collected in France.

The Exsiccati (1–28) are arranged in 230 (mostly bound) volumes, like those used in the North American Fungi, only more elaborate, being covered with marbled paper, with the covers bound in cloth. These 230 volumes do not include Rehm's Ascomycetes and Kunze's Fungi Selecti, which, as already stated, are in boxes.

To make the herbarium available for practical use, a card index, alphabetically arranged, has been prepared, so that any specimen of the forty thousand estimated to be in the collection, can be found in less than a minute's time, whether contained in one of the bound volumes or in one of the boxes or cans.

Besides the collection of Fungi, there is a small collection of Lichens, including a complete set of Lojka's Lichenotheca Universalis (250 species) and about 300 species of American lichens, put up in six bound volumes, uniform with the rest. There are also 300 numbers of Rehm's Cladoniæ, and 300 numbers of Macoun's Canadian Mosses, the latter arranged in three bound volumes.*

This extensive mycological herbarium has been purchased † (1896) by the Board of Managers of the New York Botanical Garden, and will be deposited in the fire-proof museum building of the garden, which is about completed in Bronx Park. The purchase also includes a considerable portion of Mr. Ellis' library, and the collection will be taken to New York and placed in a fire-proof storage warehouse until it is finally placed in the garden.

ALBERT COMMONS.

Albert Commons, the son of John and Ann (Phipps) Commons, was born in the village of Doe Run, West Marlborough Township, Chester County, Pennsylvania, January 23, 1829, the fifth on his father's side, from Elizabeth Maxwell (a niece of Daniel Defoe) of London, England, who came over in 1725 and was married to Thomas Job, of Nottingham, Maryland. On his mother's side he is seventh in descent from Joseph Phipps, who came over with Penn's Colonists in 1682, and who was elected a representative from Chester County to the first Assembly that met at Philadelphia in 1683.

Owing to ill-health and a delicate constitution, the only education Albert Commons received was that obtained at the

* Description by Mr. Ellis in pamphlet form, issued October 15, 1892.
† See *Garden and Forest*, IX: 110, March 11, 1896.

country district school, where he became interested in botany through an older half brother, Franklin Commons, who, while a student at the Academy at Unionville, in 1839, had purchased a copy of Darlington's "Flora Cestrica," and also had a tin collecting box made. Thus equipped, the brothers made excursions to collect botanical and mineralogical specimens, until at the time of his brother's decease in 1842, they had acquired a collection of about five hundred botanical specimens. Albert's first botanical trip in Delaware was in 1842, when, soon after the removal to the farm, his brother took him along on one of his excursions around the neighborhood. Ever since that he has taken an interest in botanical pursuits, and has now a larger collection of the plants of Delaware, perhaps, than any other in the state. Having nearly three thousand species listed—of mosses, over sixty species; hepatics, forty species; lichens, 160 species, and of fungi, 1300 species.

JOHN MICHAEL MAISCH.

John Michael Maisch * was born in Germany, at Hanau-on-the-Main, January 30, 1831, his father being Conrad Maisch, a merchant of moderate means in that town. He attended, at first, a private school, then the city free school, and later the middle public school.

Here he soon attracted the attention of his teacher, Pastor Wörishoffer, and by him he was employed to correct the lessons of the lower class, and in return received instructions in the rudiments of French. At the age of twelve and a half years he left this school, and on the advice of his parents he determined to learn the jewelry

* *American Journal of Pharmacy*, January, 1894, LXVI: 1.

business. His instruction lasted, however, only a few days, as he was still of the age when he was compelled by law to attend school, and his parents could not obtain an official dismissal. School Inspector Roeder, on the recommendation of Pastor Wörishoffer, however, obtained for him free instruction in the class of the Realschule, into which he was taken on trial. Here, again, he proved an apt scholar, and drew the attention of his teacher, Pastor Beinhauer. Roeder, having obtained permission to open an Ober-realschule, Maisch was taken into the third division. Theobald, the teacher of botany and zoology, became interested in the young student, and revealed to him the wonders of the microscope. Under the same direction Maisch attended botanical and mineralogical excursions in the vicinity of Hanau. These opportunities caused Maisch to give up his intention of studying theology and devote himself entirely to the natural sciences as a life-work, but it seemed as if fate had ordained otherwise.

Compelled to leave Germany on account of his connection with a party of revolutionists, he emigrated to America, landing in Baltimore in 1849. On his arrival he was almost penniless, and to supply the necessaries of life, he obtained employment in a paper-box manufactory, and subsequently in a mattress factory until about half a year later, when he made the acquaintance of Dr. Wiss; this gentleman desired to open a drug store, which he afterwards succeeded in doing, and Mr. Maisch took charge of the store for him during a few months in 1850, after being instructed by Dr. Wiss and Dr. Vogler. Towards the end of 1851, the store was sold, and Maisch then obtained employment in Washington, where he held the position of assistant in a drug store until 1853, when he came to Philadelphia, as his

JOHN M. MAISCH.

UNIVERSITY OF ARIZONA
LIBRARY

parents and some of his sisters had arrived from Europe. Until 1855 he acted as clerk in Philadelphia and New York, and in the latter part of this year was employed in a chemical factory of Brooklyn. In 1856 Mr. Maisch returned to Philadelphia and accepted the position of clerk, with E. B. Garrigues and Robert Shoemaker and Company, until 1859; he then took charge of one of the departments of instruction in the School of Pharmacy for medical students, which was conducted by Professor Parrish, in an upper room in the building at the south-west corner of Eighth and Arch Streets, the first story of which was occupied as his drug store. In 1861 Mr. Maisch was called to the College of Pharmacy of the City of New York, as Professor of Pharmacy and Materia Medica, and for the time in which he was not engaged in his duties at the College, he found employment at the laboratory of Dr. E. R. Squibb. In 1863 Professor Maisch returned to Philadelphia to organize and conduct the United States Army Laboratory, proposed by Surgeon-General Hammond, and of this he was Director until the close of the war. After the close of the war, Professor Maisch opened a drug store at 1607 Ridge Avenue, which he conducted until 1871, when he was compelled to dispose of it, in order to give his whole attention to his duties at the Philadelphia College of Pharmacy, and the secretaryship of the American Pharmaceutical Association. In 1856 Mr. Maisch joined the American Pharmaceutical Association, and in 1860 was made Reporter on the Progress of Pharmacy. Here he introduced the arrangement of the articles which has since been retained. In 1863 he was made First Vice-President; in 1865, was elected Permanent Secretary, which position he retained until the time of his death.

The College of Pharmacy attracted the attention of Mr. Maisch as soon as he arrived in Philadelphia, and it was not long before he was elected a member, and became a contributor to its journal. The earnest manner and industrious habits of the young German made an impression upon the Editor of the Journal and the Professor of Pharmacy in the College, William Procter, Jr. On the relinquishment of the chair of pharmacy, in 1866, by Professor Procter, on account of ill health, John M. Maisch was called upon to fill the vacancy. In 1867, however, Professor Maisch exchanged chairs with Professor Parrish, and at the same time the title of the chair of materia medica, formerly held by Professor Parrish was enlarged, so that it became that of materia medica and botany. Professor Maisch retained the chair of materia medica and botany until the time of his death, a period of twenty-six years, and the services which he has rendered to American Pharmacy during this time will never be forgotten.

When ill-health compelled Professor Procter, in 1870, to resign the editorship of the *American Journal of Pharmary*, Professor Maisch was unanimously chosen to fill the position, and at the same time the Journal was enlarged by making it a monthly instead of a bi-monthly publication, and the same qualities, with which he was so plentifully endowed, were now enlisted in this new field of labor. The year 1870 was an eventful one for him, for in addition to his other duties, he was called to take charge of the chemical laboratory, which had been organized in the college, through the efforts of the Alumni Association.

His interest in pharmaceutical literature, and his desire to add to the sum of knowledge in his chosen pro-

fession, was manifested soon after he arrived in Philadelphia, and the first paper that he wrote for the *American Journal of Pharmacy* appeared in March, 1854, the title being: "On the Adulteration of Drugs and Chemical Preparations."

Conjointly, with Dr. Alfred Stille, was issued the "National Dispensatory," each author dividing the field of labor between them, Professor Stille writing the medical and the therapeutical portions, whilst Professor Maisch supplied the botanical, chemical and pharmaceutical material; this work has gone through four editions. He also issued a work entitled, "Organic Materia Medica." *

On the 24th of September, 1860, he was elected member of the Board of Trustees of the Philadelphia College of Pharmacy. His first botanical paper appeared in the Journal in 1861, and is entitled "On Chelidonium Majus." This contains also a chemical account of the constituents and properties of the plant.

From 1861, when his first botanical paper was published, until 1893, when his last paper appeared, "On the Tubers of Dioscorea Species," a large number of important articles appeared from his pen.

In 1892 Professor Maisch's friends noticed that at times he appeared to be suffering, and for the first time in many years he was occasionally compelled to relinquish some of his lectures. It was not, however, until April, 1893, that he experienced a difficulty in swallowing food. At first no one realized the significance of this symptom, and it was only after a considerable increase of this painful sensation that he sought medical advice. Gradually, but surely, the

* *A Manual of Organic Materia Medica, being a Guide to Materia Medica of the Vegetables and Animal Kingdoms for the Use of Students, Druggists, Pharmacists and Physicians.* By John M. Maisch, Ph. D. Third edition. Lea Brothers & Co., 1887, octavo, xv, 532 pp.

orifice of the œsophagus became smaller and smaller, and it was soon recognized that a malignant growth was pressing upon it to such an extent that solid food could no longer find an entrance into the stomach, and after five months of painful suffering, which he bore with fortitude and resignation, he peacefully passed away on the 10th of September, 1893. Just before death he was awarded the Hanbury Gold Medal for distinguished services and for original research in the natural history and chemistry of drugs.

His mind was imbued with a love for science, and the characteristic which thoroughly pervaded all of Professor Maisch's work as a scientist, was the persistent search for truth, for he would never rest until he was satisfied that the utmost effort had been put forth to eliminate error, and it was the knowledge of this trait in his character which gave to his scientific opinions so much weight. Outspoken often to brusqueness in condemning error, his mind was always open to conviction, and he was never ashamed to change his views when he was convinced that they were not correct.

WILLIAM MARRIOTT CANBY.

William Marriott Canby was born in Philadelphia, Pennsylvania, March 19, 1831. He was educated mainly by private tutors and at private schools. His father was a successful merchant in Philadelphia. When William was five years of age, the family removed to Wilmington, Delaware, where before the boy was twenty years of age he had purchased a farm on the Brandywine, near Chaddsford, Pennsylvania. He had an early predilection for botany, but could never find time to devote himself exclusively to it. Several

articles have been written on insectivorous plants, notably those on *Dionæa* in the *Gardener's Monthly*, on *Darlingtonia* and on *Drosera*. He has pursued systematic botany, publishing many species and describing several new ones. The main work of Mr. Canby's life has been the accumulation of a splendid herbarium of 30,000 species, now in possession of the College of Pharmacy, of New York, and one of 8000 species, mainly from the United States, made for the Society of Natural History of Delaware.

Mr. Canby during his active life has botanized extensively in almost all parts of the United States and Canada, and has distributed very many thousands of specimens. He has had the personal friendship of such botanists, as Drs. Gray, Engelmann, Sargent and others, besides having a very large and widespread botanical correspondence in many parts of the world.

In 1866 he again removed to Wilmington, Delaware, where, as a business man, he has been engaged as Receiver and President of the Delaware Western Railroad Company; President of the Wilmington Institute (Library, etc.), of the House of Friendless and Destitute Children, of the Associated Charities; President of the Wilmington Savings Fund Society, of the Delaware Field Club, of the Delaware Society of Natural History, and a director in various financial institutions.

The large and fine herbarium of William M. Canby * was purchased by the College of Pharmacy, of the City of New York, and deposited in their building, on Sixty-eighth Street, near the Boulevard. Mr. Canby's early fondness for botanical pursuits found a welcome opportunity

* 1892. *Torrey Botanical Bulletin*, XIX : 336.

for gratification when a bronchial trouble drove him to Florida early in the year 1858. Coming homeward by way of Savannah and Aiken, South Carolina, quite a large and varied collection was made. This was supplemented in August by a month's botanizing in the mountains of southwestern Virginia, especially about the cliffs of New River and the Salt Pond Mountain. A two months' visit to Europe next opened some opportunities for exchange and correspondence.

Up to August, 1860, efforts were mainly confined to obtaining specimens of the flora of Delaware, eastern Pennsylvania and the pine barrens of New Jersey. At the date mentioned an extensive journey was made to New York, New England and Canada. The collections made at this time enabled him to exchange extensively with botanists in the three western states of Ohio, Indiana and Illinois, as well as with some in New England and New York. Among these may be mentioned Dr. Vasey, Messrs. Hall and Bebb, of Illinois; Watson, Hope and Lapham, of Wisconsin; Sullivant, of Ohio, Dr. Sartwell and Judge Clinton, of New York, and several in New England. Professor Porter and Dr. Traill Green, of Pennsylvania, were also most esteemed correspondents.

About this time, also, Mr. Canby became acquainted with Drs. Gray, Torrey and Engelmann, and active correspondence and most valuable exchanges were the result. The immense stores of foreign botanical treasures which at that time came to Dr. Gray were freely shared with Mr. Canby. He also became a purchaser of all valuable sets of American plants which he could find. The first of these were those of Dr. Parry and Messrs. Hall and Harbour,

WILLIAM M. CANBY.

UNIVERSITY OF ARIZONA
LIBRARY

made around Pike's Peak and other Colorado mountains, and the plains at their base. He also purchased from the late Charles Wright more than two thousand numbers of his Cuban collection.

At the death of Mr. Sullivant his large collection was sent to Dr. Gray, and through his kindness the whole of the foreign collection was incorporated in the Canby Herbarium. This was particularly rich in the Spanish and Grecian collections of Boissier, in the Siberian and Altai collections of Bunge and Ledebour, in the Italian collections of Tenore and Gasparini, and in a large and valuable representation of the plants of France and Germany. He also obtained a part of the Venezuela collection of Fendler, and a goodly number of that of Mandon and other collectors in the cordilleras of South America. He also received many specimens from Schultes Bipontinus, Dr. Schnor and Karl Keck, of the various German countries, from Professor Parlatore, of Italy, René Lenormand, of France, and many others.

From Professor Lenormand was also received a very fine collection of the peculiar flora of New Caledonia, which had been placed in his hands for study and distribution. While on the subject of foreign specimens it must not be forgotten to mention the many thousands of species received from Baron von Mueller, of Australia, Professor MacOwen, of South Africa, and Dr. Cheeseman, of New Zealand.

In this country Mr. Canby has exchanged with every one he could find who made good specimens, and has purchased all the collections of Curtiss, Hall, Bolander, Kellogg, and the other California and Oregon botanists. Later he corresponded with Professor Post, of Syria, and

received almost the whole of his excellent collections in Lebanon and the Holy Land. Mr. Ball sent him many specimens from his herbarium, a very rich one, and also a suite illustrating his flora of Morocco. Besides this, he made an excursion to Colorado and one to California, which resulted in the acquisition of several new species and many valuable specimens. In 1868 he again spent a winter in Florida, coming north, as before, by way of western South Carolina and Virginia.

This resulted in the gathering of about 12,000 specimens, which were mostly valuable for exchange, as well as in a more direct way. He has also, either alone or in company with Drs. Gray and Engelmann, Professor Sargent and Mr. Redfield, made excursions to the mountains of North Carolina, the results of which added much to the value of his herbarium. He also purchased the fine collection of Fendler, in Trinidad; of Garber, Sintenis, and others in Porto Rico; of Garber, in South Florida; of Pringle, Palmer and Parry in Mexico and the border states, and has, unusually full sets of the various government collections, and of the various collectors of the Sandwich Island plants.

The very extensive collections of Dr. Rusby in Arizona and New Mexico, and in South America, and that of Mr. Bang in the latter continent, are incorporated in the herbarium, as are also the valuable collections of Professor Greene, of Mrs. Austin and Mrs. Ames, and of Professor Lemmon, Dr. Parry, Messrs. Jones, Parish, Orcutt, Howell, Cusick, Tweedy, Suksdorf, and many others in the far West and South. Most full and valuable collections were received from Dr. Mellichamp, of South Carolina, illustrating Elliott's flora.

Lastly, as one of the botanists of Mr. Villard's North Trans-Continental Survey, a full suite of all the collections made by it, came to his herbarium. With these, also, came the collections of the Canadian Government Survey, and a large contribution from Professor Macoun's private collection. From this account it will be seen that during thirty years no collection, which enterprise and money could secure, failed to become represented in the Canby Herbarium.

RACHEL L. BODLEY.

Rachel L. Bodley was born in Cincinnati, December 7, 1831. She was blessed with an excellent mother, under whose pious and devoted care her early education was received until she was twelve years old. Shortly afterward she entered the Wesleyan Female College of Cincinnati, in 1844. Throughout the five years' college course she acquitted herself with honor, and in 1860 she was made preceptor in the higher collegiate branches, but feeling dissatisfied with her qualifications, and having a greater work in view, she came to this city and entered the Polytechnic College as a special student of chemistry and physics. After two years' work here she returned to her home, and was made Professor of Natural Science in the Cincinnati Female Seminary. While professor in this seminary, an extensive collection of specimens in natural history was bequeathed to it by Joseph Clark. Professor Bodley, in the preface to the catalogue of this collection, says: "In the midst of abounding wealth, famine was inevitable through lack of classification." Upon the task of making this catalogue, she entered single-handed with a resolute will. There were foreign plants, she writes, British ferns and mosses, and packages of plants

from New Zealand. In the absence of any reliable manual which embraced the countries represented by these plants, they were classified as far as orders and genera with Lindley's "Vegetable Kingdom" as a guide. The mass was carefully opened, the plants identified, arranged in labelled sheets of uniform size, and the whole placed in a convenient herbarium case in complete readiness for reference and study. During three years she labored patiently and faithfully upon it during her leisure hours, and it was only in her fourth summer vacation that she finished the forty-eight page catalogue of plants, which made a valuable contribution to local botanical knowledge. It must have been a valuable part of the laboratory practice on which she labored with such earnestness, and the practical results were shown in the delightful and able lectures which she delivered on cryptogamous plants of land and sea during the spring of 1867 and 1868.

In 1865 she was elected to the chair of chemistry and toxicology in the Woman's Medical College. In 1874 she was made the Dean of the Faculty, which position she held until the time of her death. In 1873 Professor Bodley was elected corresponding member of the Cincinnati Society of Natural History; in 1876 she was elected to the New York Academy of Sciences, and the same year to the American Chemical Society of New York City.

In 1879 the honorary degree of Doctor of Medicine was conferred upon her by the Woman's Medical College. She was elected a member of the Franklin Institute in 1880. Professor Bodley was deeply interested in education, as is shown by her election in February, 1882, to be a School Director of the Twenty-ninth Section in Philadelphia.

Her papers on botany were mainly contributed to the Philadelphia *Ledger*, where a series on sea-weeds, collected at Longport, attracted considerable and favorable attention. Death ended her scientific labors on June 15, 1888.

JOSIAH HOOPES.

Josiah Hoopes was born in West Chester, Pennsylvania, November 9, 1832. When three years of age, his parents removed to Philadelphia, where they resided for fifteen years, thence returning to West Chester, where the subject of this sketch has been a resident since. In early life he attended one of the grammar schools of Philadelphia until the establishment of Friends' Central School, a noted institution of learning, where he completed his course of study. Descending from the same emigrant ancestor as John Bartram, the noted botanist, he early developed a love for nature, which was fostered by constant intercourse with the three distinguished botanists, Dr. William Darlington, David Townsend and Joshua Hoopes, all residents of West Chester. To the enthusiasm of these gentlemen as teachers, is due the love for trees and plants that was so early developed in the pupil, so that after a practical acquaintance with the flora of his native county, his field of study was ambitiously enlarged to embrace more especially the arborescent vegetation of the world. In this line he was particularly drawn to the *Coniferæ*, a natural order opening up to the student of botany so many unsolved problems and interesting lessons in plant-life, that the love of his earlier years has continued with increasing interest until the present time. In his chosen path he was very fortunate in possessing the acquaintance and correspondence of the late

Dr. George Engelmann, of St. Louis, and Dr. C. C. Parry, of Davenport, Iowa, as well as the critical and valued assistance of the late Dr. Asa Gray, of Cambridge, and Dr. Maxwell T. Masters, of London, England. Without such efficient aid it would have been practically impossible for him to publish his unpretentious little work on the "Cone-bearing Plants of the World," which was issued in 1868, and dedicated to his life-long friend and preceptor, Dr. William Darlington.*

In April, 1866, he was elected a member of the Academy of Natural Sciences of Philadelphia, at a period when the only active botanists connected therewith, numbered but three or four. Although business cares and distance from the city prevented him from taking an active part in assisting to re-arrange the extensive herbarium belonging to the institution, nevertheless, his deep interest in the work prompted him to render his assistance whenever available, and the large and valuable collection of cones belonging to the Academy is almost exclusively owing to his own individual exertions. At a time when the flora of the western states and territories was but imperfectly understood, he, in company with congenial botanical friends, made extensive collections in Colorado, Kansas, Nebraska, as well as on the Pacific coast, which resulted in a voluminous herbarium, now in charge of an institution of learning where the younger generation of students may reap the benefit of his life-work in the field of botanical science. The subject of this sketch has written but few strictly scientific papers for publication, as the aim of his life has

* *The Book of Evergreens. A Practical Treatise on the Coniferæ, or Cone-Bearing Plants.* By Josiah Hoopes. Illustrated. New York, Orange, Judd & Company. Octavo, pp. vi, 435.

been rather to secure the attention of the severely practical student of horticulture, and induce a more lively interest in those who rarely look beneath the surface of plant problems. With this view, he was for many years connected with the New York *Tribune*, and it is to be hoped that his efforts to explain some of the mysteries of plant-life, as recorded in its columns, may have borne good fruit.

As an aid to a better acquaintance with the resinous trees, about twenty or more years ago, he selected a suitable lot of ground, wherein was tested specimens of every known species and well marked variety of this important order, this being perhaps the first effort of the kind in the United States. The task proved far greater than most would suppose, as the tender and uncertain class of trees required constant attention to preserve their health, and although at the present time, a large number have succumbed to the vicissitudes of our variable climate, there still remain many very beautiful specimens which are at once the joy and pride of their owner. His love for trees and plants, thus early shown in life, was the main inducement for him to engage in the propagation and sale of these commodities, so that after forty-three years of business life, as a nurseryman, he feels that possibly the time may not have been misspent, and that the result may prove a more enduring and beneficial monument to his memory, than could otherwise have been devised.

Twenty years ago Mr. Josiah Hoopes planted in connection with his nursery in West Chester, a pinetum with a view of testing the hardiness and adaptability of his favorite plants to the climate of the Middle States. The collection, which was made as complete as possible, was

planted on the top of a hill somewhat protected by neighboring plantations, and in good, strong, well-drained soil. No special care has been given to the plants, and those which remain are standing in a thick sod of grass.

A writer in *Garden and Forest*, November 1, 1893, (VI : 458), says of the pinetum: "Before describing the trees that are left standing, it will be well to explain that all the species and varieties of Cupressus have disappeared entirely, as have most of the South European, Indian, Mexican, and South American species and their varieties. With a few exceptions, all the conifers of the Pacific States of North America have succumbed to our cold winters or moist summers. Few of the pines which were planted twenty years ago are left. The European *Pinus sylvestris*, *P. Austriaca* and *P. Laricio* are alive, but have passed the period of their greatest beauty and show signs of premature decay. *Pinus Strobus nivea* has grown into a compact and handsome plant, but the other forms of the white-pine have disappeared, owing, perhaps, to the attacks of a new enemy, which, Mr. Hoopes informs me, has destroyed many of the white-pines in West Chester. *P. monticola*, its western representative, has grown into a tall, thin specimen, some twenty feet high, showing the thin, lanky habit of this tree in cultivation, which is, however, one of the hardiest of the western pines here at the east, although as an ornamental tree it cannot be compared with the native white-pine. Of the other white-pines, the sugar-pine, *P. Lambertiana*, of California, and *P. excelsa*, of the Himalayas have disappeared, but the collection still boasts, in perfect health and beauty, one of the best specimens of *P. Peuce*, of southeastern Europe, which can be found in cultivation—a

narrow, compact pyramid fifteen feet high, and clothed with foliage to the ground. *P. densiflora*, easily distinguished by the white terminal buds, is eighteen feet high, wide-branched and covered with cones. As an ornamental tree it is no better than the Austrian pine, and is inferior to our native red-pine, *P. resinosa*, our northern pitch-pine (*P. rigida*), which we looked for in vain. They appear to have succumbed, as have the following American species: *P. palustris, P. Sabiniana, P. flexilis, P. pungens, P. inops* and *P. Taeda*, while *P. koraiensis*, of Corea, *and P. Bungeana*, of northern China, have grown into remarkable specimens.

"Several firs have grown into handsome trees, although it should be remembered that a fir twenty years old is at its best as an ornamental tree, and that with greater age it too often grows thin in the lower branches and loses much of the perfection of form which makes some young firs beautiful objects. To the lover of rare trees the most interesting fir in the collection is a plant of *Abies amabilis*, of the Cascade Mountains of Oregon and Washington. This plant has evidently had a hard time in getting a start, but now looks strong and vigorous, and is about six feet high. Two or three handsome specimens of the white-fir of the Sierras, the *Abies concolor* of botanists, and in gardens variously called *A. Lowiana, A. lasiocarpa*, and *A. Parsonsiana*, bear witness to the beauty and hardiness of this noble tree, which is the only Pacific Coast fir which is really satisfactory in the eastern states. *A. Nordmanniana*, which has grown taller than any other fir in the collection, appears to be suffering from an overproduction of cones, and, moreover, is getting thin near the ground, showing that in our

climate it is only in early age that this tree is usually considered very hardy or desirable, here, is in perfect condition and great beauty, and so are good specimens of *A. cephalonica*, *A. cilicia*, one of the best of all firs in our climate, and *A. Apollinis*. A remarkably slender and compact pyramidal form of the fir of Europe, *A. pectinata*, is one of the most noteworthy plants in the collection.

"Among the spruces, *Picea orientalis* takes the lead in beauty and vigor. This tree, so far as is possible to judge at this time, is one of the handsomest and most satisfactory of all the exotic conifers which have been brought into our gardens. The Colorado spruce, *P. pungens* and *P. Engelmanni*, are in good condition; indeed, the hardiness and vigor of these two trees seem able to resist any sort of climate or soil that can be found in the northern or middle states. The tide-water spruce, of the north-west coast, *P. sitchensis*, is ragged and unsatisfactory, and appears to suffer from the cold of the Pennsylvania winters, and the long, hot, dry summers. On the other hand, *P. Smithiana*, of the Himalayas, is in excellent condition, and promises to grow into a large and beautiful tree. A remarkably fine plant of what is known as Whale's Norway spruce, a pendulous-branched sport of the Norway spruce, which originated many years ago near Boston, will interest those who care for trees of monstrous form.

"There are no remarkable specimens of Juniperus in the collection, and the Cedars have all gone, although in a neighboring garden there is a good plant of the Lebanon variety. There is a healthy little specimen of the western mountain hemlock, *Tsuga Pattoniana*. There is a fair, but not a remarkable specimen of the Japanese *Sciadopitys*, and

large plants of the Japanese Retinosporas (*Chamæcyparis obtusa* and *C. pisifera*), but none of the juvenile forms of these two trees have attained any size or beauty."

Enough, perhaps, has been said to show the value of this pinetum as an object lesson to planters of coniferous trees.

BENJAMIN HERITAGE.

Benjamin Heritage was born about two miles from Mickleton, Greenwich Township, New Jersey, August 18, 1833. He was educated in the public schools, and pursued farming near Mickleton until 1885. All of his leisure time has been devoted to the study of botany and the collection of plants. His herbarium is noted for the beauty of the specimens and for its richness in the rare and local plants of New Jersey. Mr. Heritage contributed numerous specimens of weeds to the "Two Centuries of American Weeds," prepared and issued by Professor Byron Halstead, of Rutger's College. Mr. Heritage is a member of the Philadelphia Botanical Club, and is active in its welfare. His most important paper is entitled, "Preliminary Notes on Nelumbium luteum."*

WILLIAM HERBST.

Dr. William Herbst was born September 24, 1833, near the City of Reading, Berks County, Pennsylvania. His father was Dr. Frederick William Herbst, who emigrated from Saxony, Germany, in the year of 1825.

While a mere youth, he used to accompany his father in his daily visits to the sick in Berks County, where the son first acquired a taste for botany. While the father was

* *Bulletin Torrey Botanical Club*, XXII: 266.

engaged with his patients, his son would gather specimens. He was quite fascinated with the fanciful names given to the specimens, which he got out of an old German botany. In those days it was difficult to procure good literature on the subject of botany. When a mere youth, fifty years ago, he heard of a botanical work by a Mrs. Lincoln. He tried to get a copy in Reading, but none could be had, so he was obliged to send to Philadelphia. Receiving it, he made good use of it, prizing it more than other books.

The common schools in those days did not satisfy his father, so the boy was sent to the Nazareth Moravian Seminary, to Freemont Seminary at Norristown, and finally to Williston Seminary, East Hampton, Massachusetts. At the latter place his wish was fully gratified by being allowed to study botany, under Dr. Edward Hitchcock, who recommended the new book on botany (Wood's first edition). He explored fields, meadows, and woods in the vicinity of East Hampton in search of specimens, which were arranged in an herbarium, sometimes neglecting his other studies in pursuit of his favorite science.

After returning home from Williston Seminary, he commenced to read medicine, with his father as preceptor, during which period he made frequent excursions among the hills and valleys of Berks. He remembers, with pleasure, the excursions taken with the late Dr. John P. Heister, of Reading, an enthusiastic botanist.

After reading medicine at home he entered Jefferson Medical College, and graduated in the class of 1855, locating in the small but ancient village of Trexlertown, Lehigh County, Pennsylvania.

The study of the flora of Lehigh County has, since his

William Herbst

UNIVERSITY OF ARIZONA

location at Trexlertown, received his attention for the last forty years. For a number of years he occupied the chair of botany at Muhlenberg College, Pennsylvania. Of late years he has made fungi a special study, especially the *Basidiomycetes*, of which he has a large collection.

His principal correspondent is Professor Charles H. Peck, of Albany, New York, who, under date of August 25, 1894, acknowledges the discovery of a new species in the following:

"That was a splendid fungus you sent me. It is an undescribed species of Sparassis. I propose to name it, with your consent, *Sparassis Herbstii*, sp. nov."

He also found the only specimens of the fungus *Queletia mirabilis* Fr. ever procured in this country, and Professor Peck wrote, having seen the plant:

"Thanks for your kind offer to send me some more specimens of *Queletia mirabilis* Fr. So far you are the only one to find it in this country."

In Professor Peck's report of 1895 of "New Fungi" are found four new species which this collector added to the list.

His published articles are very few, published in an Allentown local paper as follows: "The "Selfish Flower"—*Gentiana Andrewsii*; "Welcome Spring Flowers;" "Corn Smut and Superstition;" "Mushroons or Toadstools."

GEORGE MACLOSKIE.

George Macloskie * was born at Castledown, County Derry, Ireland, September 14, 1834. He attended Queen's College, Belfast, where he received a gold medal in natural science in 1857, and in physical science in 1858.

* See *Appleton's Cyclopedia of American Biography*, from which the main facts are taken.

Subsequently having studied theology, he became a Presbyterian minister, and was installed over the Parish of Ballygoney during the period of 1861 to 1873. From 1873 to 1875 he was the Secretary of the Bible and Colportage Society. When he was called to the chair of biology in Princeton in 1874, where he has been since, Professor Macloskie received the honorary degree of D. Sc. from Queen's University and that of LL. D. from London University, where, in 1871, he received a gold medal for special excellence in a law examination. He is a member of several scientific societies, and is a Fellow of the American Association for the Advancement of Science. His writings, include papers on entomology and on botany, published in the *American Naturalist* and in *Psyche*, and he has published a book on "Elementary Botany" (New York, 1883, second edition 1887). A few of his most important publications have been printed in the *Bulletin of the Torrey Botanical Club*, "Vegetable Spiralism," XXII: 465; "Observations on Antidromy," XXIII: 202; "Further Observations on Antidromy," XXIII: 240; "Internal Antidromy," XXIII: 536; "Heat of Imbibition by Seeds," XXV: 272.

J. BERNARD BRINTON.

Dr. J. Bernard Brinton * was born near Waynesburg, Chester County, Pennsylvania, August 16, 1835. His parents belonged to the religious Society of Friends. His early education was received at this place, and subsequently at the High School in Philadelphia, during the short residence of the family in that city, previous to removal to a farm in Maryland, in 1848. He began the study of

* 1895. *Bulletin Torrey Botanical Club*, XXII: March, 1893, with portrait.

medicine in 1857, and matriculated at the Jefferson Medical College, from which school he was graduated on March 25, 1859.

During his college course, the attention of Professor Samuel D. Gross was attracted to him by the assiduity displayed in his studies, and furthermore by the successful management of an aneurism case treated by digital compression. As a result he was appointed Chief of the Surgical Clinic soon after graduation. He lectured on practical anatomy at the Philadelphia School of Anatomy and Operative Surgery, and also conducted a quiz on materia medica. From his graduation to the breaking out of the Civil War, he was an active practitioner of medicine, and in 1860 was a delegate to the American Medical Association, held in New Haven, Connecticut.

But the fire of patriotism proved too strong for the peaceful tenets of his fathers, and led him early in the war to apply for the position of assistant surgeon in the regular army. He successfully passed the rigorous examination, and his commission was dated April 16, 1862, signed by the President, Abraham Lincoln, and Edwin M. Stanton, Secretary of War.

On September 14, 1863, he was appointed Medical Purveyor to the Army of the Potomac, and he retained that position to the close of the war. During his entire army life he continued his botanical studies and collection of plants. At this time it was his good fortune to meet another officer equally interested in the study of the same science, Major-General G. K. Warren. A wayside flower served as a means of introducing these officers, and the occasion of that meeting was a favorite reminiscence of

Dr. Brinton. The collections he made during the Virginia campaign were captured by the Confederate, Colonel Mosby, at Belle Plain, May 12, 1864, and burned with the supply wagons. Dr. Brinton, himself, barely escaped capture. On May 13, 1865, he was brevetted Captain and Major for gallant and meritorious services, and on November 16th, of the same year, he resigned from the army. His services to the Union were marked by his usual application and devotion to duty, and his report at the close of his term of office was considered a remarkably accurate record for one handling a vast amount of material under such turbulent conditions.

Returning to Philadelphia, he continued in the practice of medicine for a few years. Desiring more leisure time for the study of his chosen science, he abandoned medicine and engaged in various manufacturing pursuits. On October 29, 1878, he was elected a member of the Academy of Natural Sciences, and in the same year he connected himself with the Botanical Section of that institution. He was faithful in attendance and contributed many specimens, notes, and verbal communications. He was an indefatigable collector, and made numerous excursions in Pennsylvania and neighboring states. He made a special study of the peculiar flora of the pine barrens of New Jersey, in which he was recognized as an authority. He acceptably filled numerous positions of honor and trust in the Academy of Natural Sciences, and at the time of his death was a member of the Board of Councillors. During the session of the American Association for the Advancement of Science in Philadelphia, in 1884, he was elected a member, and he acted as guide to an excursion of visiting botanists to the pine barren region of New Jersey.

Only the ardent lovers of nature can understand his feelings when, on that occasion he showed Dr. Asa Gray and Mr. Carruthers, President of the Linnæan Society, the secluded *Schizæa pusilla* Pursh. Nor can the joy of those gentlemen be expressed when their eyes rested on that quaint fern form growing wild for the first time.

He was elected to active membership in the Torrey Botanical Club, of New York, January, 1891. Although publishing but little on botanical subjects, he corresponded with most of the botanical authorities in America and made numerous exchanges. Perhaps his most important labor consisted in inducing the young to study botany, and his greatest pleasure seemed to be in imparting to others, either in the field or in his "den," a portion of his rich store of knowledge. Chiefly with this object in view, he founded the Philadelphia Botanical Club, in December, 1892, of which he was President from its organization until the time of his decease.

Dr. Brinton was married on November 13, 1862, to Sallie W. Clemens, of Philadelphia. A married daughter and two sons survived him. As a source of consolation, after the death of his wife, he engaged more earnestly in botanical studies.

Dr. Brinton was noted for the accuracy of his observations in field excursions, in which he was generally recognized as the leader and guide. His methods were always painstaking and careful, and in his aim to secure choice specimens, no trouble, labor nor expense was too great. His botanical specimens were preserved in the most approved and artistic style and identified with the most scrupulous care. He had a marvelous memory for names

and characters. This gift enabled him to recognize specimens which he had not met with for many years. He personally constructed in the most skillful manner his herbarium cases, tables, stands, microscopical cabinets, etc., with a degree of perfection rarely excelled by expert artisans. While so ardently devoted to nature in her various manifestations, Dr. Brinton did not overlook the advantages of linguistic attainments. In his earlier life much of his time was devoted to the study of German, in which language he conversed fluently. He was also proficient in Latin and French.

Physically, Dr. Brinton seemed to embody the highest expression of perfect manhood. His commanding presence and graceful bearing stamped him at once as a leader. His powerful frame enabled him to endure and overcome great hardship and fatigue.

The botanical community in which he moved met with a severe loss in his sudden death on December 6, 1894.

MARY TREAT.

Mrs. Mary Treat, an American naturalist, whose original researches have been gratefully acknowledged by scientists at home and abroad, was born in 1835, in Tompkins County, New York; but for the past twenty-seven years has made her home in Vineland, New Jersey. She was married, in 1861, to Dr. Joseph Treat, who died in 1879.

She began her studies at a time when text-books on the natural sciences were rare, and pursued them mainly by self-directed investigations in the field of nature, receiving encouragement and assistance by correspondence

with such men as Darwin, Forel, Mayer, Asa Gray, and others, who in turn have frequently expressed their obligations to her.

Endowed by nature with a spirit of enduring patience, and developing a deep enthusiasm for her life-work, she joyfully devoted to it countless hours of silent watching in the heat of summer suns, sittting or standing statue-like in her "Insect Menagerie," or finding her delight in bending over the microscope while others slept.

In botany, in addition to a close and exhaustive study of the flora of New Jersey and of Florida, Mrs. Treat has made the insectivorous plants her special study, and has given to them prolonged investigation, visiting Florida for this purpose in 1876, 1877 and 1878. The results of her researches in regard to the structure and habits of *Drosera*, *Dionæa*, *Pinguicula*, *Sarracenia*, and especially of *Utricularia* have been valuable additions to science.

In her "Home Studies in Nature" she criticised Darwin's statement as to the manner in which the latter plant entraps its victims; to which Darwin replied: "It is pretty clear that I am quite wrong," and accepted her conclusion. In his work on "Insectivorous Plants," he again pays a just tribute to her unusual powers of careful observation, saying (page 281): "Perhaps the blades of vigorous plants would bend over captured insects, and Dr. Canby informs me that this is the case; but the movement cannot be strongly pronounced, as it was not observed by Mrs. Treat."

The following incident also illustrates the prevision with which she set forth some of the facts regarding the peculiar behavior of insects under the allurements of *Sarracenia variolaris*, and which she styled a kind of

"demoralization" or "drunkenness." She embodied her conclusions in a chapter of one of her books about to be published in 1875. Professor Gray wished to dissuade her from the publication of these statements, saying: "You know none of the botanists agree with you." "I cannot help it," she replied. "It must go in, for I have seen it for myself, and I know it is so." And now, after nearly twenty years, her statements and discoveries in this especial line are corroborated by the botanists of to-day, and described in words almost identical with her own, written so many years ago.

Her long continued and productive studies of spiders, ants, and other insects and of birds, are scarcely less important in their results, as is shown by her valuable contributions to periodicals and the annals of scientific societies throughout a period of over twenty-five years.

Although Mrs. Treat's name is too closely connected with imperishable work to be forgotten, and is commemorated in the nomenclature of various plants and insects which have either been named in her honor by the compliment of scientific men, or because their discovery was accredited to her, yet it will ever be most honored by those who have known her personally in more intimate relationship. Her most prominent characteristic is a modesty so shrinking as to make any public recognition of her services painful to her, while her joyous enthusiasm for her chosen life-work is so great and so contagious that her home is always a centre of attraction, where are welcomed all who care to learn even the alphabet of her beloved book of nature, and where she dispenses the bounty of her gifts and

attainments with a modest lavishness and an unwearied patience, which appears to be to her their own reward.*

Besides frequent contributions to *Garden and Forest*, mentioned below, she has published, in book-form, and in a style at once simple, polished and technically exact, the following works: "Home Studies in Nature"; "Chapters on Ants"; "Injurious Insects of the Farm and Garden;" "My Garden Pets," and "Through a Microscope."

Mrs. Treat has described the various phases of plant life as they have appeared in the pine barrens of southern New Jersey in *Garden and Forest:*

1. "Botanical Names," III: 206.
2. "The Wild Garden," III: 442.
3. "September in the Pines," III: 463.
4. "October in the Pines," III; 524.
5. "Ornamental Fruits in the Pines," III: 534.
6. "Evergreens in the New Jersey Pine Region," III: 546.
7. "The Pines at Christmas Time," IV: 14.
8. "Insect Enemies of the Pitch Pine," IV: 62.
9. "How to make a Wild Garden," IV: 188.
10. "Notes from a Wild Garden," IV: 351.
11. "Spring in the New Jersey Pines," V: 220.
12. "Weeds in Southern New Jersey," V: 292.
13. "Water-plants in Southern New Jersey," V: 363.
14. "Climbing Plants in the Pines," V: 400.
15. "Edible Fruits in the Pines," V: 435.
16. "Late Autumn in the Pines," V: 567.
17. "Native Plants for Winter Decoration," VI: 141.
18. "Summer in the Pines," VI: 314.
19. "Late Summer in the Pines," VI: 382.
20. "The Pines in October," VI: 443.
21. "Winter-blooming Plants in the Pines," VII: 102.

* The facts for this sketch were furnished by one of Mrs. Treat's pupils, M. E. Hall.

22. "March in the Pines," VII : 142.
23. "A New Jersey Garden in Spring," VII : 212.
24. "Early June in the Pines," VII : 243.
25. "Wayside Plants in the Pines," VII : 302.
26. "November in a New Jersey Garden," VII : 458.
27. "Late Autumn in the Pines," VII : 482.
28. "Christmas in the Pines," VIII : 3.
29. "Troublesome Grasses in Southern New Jersey," VIII : 103.
30. "In the Pines," VIII : 203.
31. "Early Summer in the Pines," VIII : 262.
32. "The Pines in a Dry Summer," VIII : 362.
33. "Autumn Color in the Pines," VIII : 452.
34. "The Heaths among the Pines in Early Winter," VIII : 492.
35. "The Pines in August," IX : 332.
36. "Early Autumn in the Pines," IX : 412.
37. "Weeds in Southern New Jersey," X : 313.
38. "Cruelty of Asclepias," X : 341.
39. "Autumn Flowers in the Pines," X : 411.
40. "Autumn Fruits in the Pines," X : 471.

ABRAHAM PASCAL GARBER.

Abraham Pascal Garber * was born at Columbia, Pennsylvania, in 1888. He took the degree of A. B. at Lafayette College where he acquired a taste for botany, and later graduated from the Medical School of the University of Pennsylvania. Dr. Garber practiced medicine for a short time in Pittsburg, but was obliged to seek a milder climate on account of ill-health. He passed several winters in Southern Florida, where he found many new species of plants, as *Eugenia Garberi, Liatris Garberi, Habenaria Garberi,* which perpetuate his memory. He also discovered that a number of West Indian trees were present in Florida. One plant especially, *Xanthoxylum emarginatum,* was dis-

* SARGENT. *Silva of North America,* I: 66.

covered by him on an island in Biscayne Bay in 1877, growing as a small shrub, and has never been collected since. Dr. Garber made an excursion to Puerto Rico in 1880. *Garberia* of a single species, a Florida shrub with Liatris-like flowers, commemorate Dr. Garber's service to American botany.

He contributed to the *Botanical Gazette* the following papers:

1. "Notes on Tillandsia," II: 59.
2. "Botanical Rambles in East Florida," II: 70, 82.
3. "Botanical Rambles in Middle Florida," II: 102.
4. "Ferns in South Florida," III-IV: 82.

CHARLES SCHÄFFER.

Charles Schäffer, M. D., was born in Philadelphia, February 4, 1838. His father, Charles Schäffer, was a wholesale druggist in the vicinity Sixth and Market Street; his mother was Priscilla Morgan, daughter of Stacy K. Potts, an old Philadelphia merchant. His early education was received at the hands of a private tutor who prepared him for the University of Pennsylvania, where he graduated in medicine in March, 1859. After graduation he spent a short time in volunteer service in the Chester Hospital in 1863, which position he was obliged to leave on account of illness. He was also attending physician at the Mission Hospital and Dispensatory from 1874 to 1880, when it closed. Dr. Schäffer has long been interested in botany, and is perfectly familiar with the flora of Philadelphia and vicinage. As a member of the Philadelphia County Medical Society, Fellow of the College of Physicans of Philadelphia, Fellow of the Geological Society of America, member of the

Academy of Natural Sciences of Philadelphia, of the American Association for the Advancement of Science, of the Pennsylvania Historical Society, of the Chester County Historical Society, of the American Philosophical Society, he has had abundant opportunity to cultivate science, and especially his favorite science, botany.

AUSTIN CRAIG APGAR.

Austin Craig Apgar was born at Peapack, Somerset County, New York, August 4, 1838. His career in science began at the State Normal School of New Jersey, where he has taught botany and zoology from 1866 to 1899. When Professor L. Agassiz opened the summer school at Penikese, Massachusetts, in 1873 and 1874, Professor Apgar availed himself of this opportunity to become acquainted with such men as Professors Agassiz, Burt G. Wilder, A. S. Packard, Edward S. Morse and David S. Jordan. Professor Apgar has taught botany in the summer schools at Glen Falls, New York; Asbury Park, New Jersey; Fort Worth, Texas; Bedford City and Salem, Virginia, and Chicago, Illinois. The following is a list of his books and papers on botany:

"Plant Analysis." 1874.

"Pocket Key of Trees." 1891.

"Trees of the Northern United States." 1892.

"Extraordinary Vitality of a Girdled Limb."—*Journal of the Trenton Natural Historical Society*, January, 1889.

"Study of Plant Life in Our Schools."—*Sixteenth Annual Report of the* [*New Jersey*] *State Board of Agriculture*, 1888–1889.

"What Shall be Taught in Country Schools to Educate Farmers."—*Eighteenth Annual Report of the* [*New Jersey*] *State Board of Agriculture*, 1890.

"How to Know Trees."—*Arbor Day Circular of New York State*, 1895.

CHARLES SCHÄFFER.

UNIVERSITY OF ARIZONA
LIBRARY

JOSEPH TRIMBLE ROTHROCK.

Joseph Trimble Rothrock, son of Dr. Abraham and Phoebe Brinton Rothrock, was born April 9, 1839, in the little village of McVeytown, Mifflin County, Pennsylvania, where his father was for half a century and more the leading physician. He traces his fondness for botany to his mother, who was distantly related to the late Dr. William Darlington, long the most famous botanist in eastern Pennsylvania.

The subject of this sketch received his earliest education in the public schools of McVeytown. Later he studied at Freeland Seminary (now Ursinus College) in Montgomery County. Leaving this he prepared for Harvard University, at Academia, a thriving, successful school in Juniata County. He was graduated from the Lawrence Scientific School, of Harvard, in the summer of 1864, receiving the degree of Bachelor of Science.

Like many another youth in those stirring times, his patriotism got the better of even his desire for knowledge, and soon after entering Harvard he left to join the army, where he served two years, until it was plain that the back-bone of the Rebellion had been broken. His first term of service was as a private soldier in Company D, 131st Regiment, Pennsylvania Volunteer Infantry. He was wounded through the thigh in the first battle of Fredericksburg, where his company, when participating in the celebrated charge of General Humphrey, had killed or wounded thirty-four out of forty-two men. His second term of service was as Captain of Company E, 20th Regiment, Pennsylvania Volunteer Cavalry. During the second term he saw much hard

service. Early in 1864 he returned to Harvard University to complete his course of study, and in July of that year passed his examination successfully and received his degree of Bachelor of Science. Professor Asa Gray had been his chief preceptor. The winter of 1864–1865 was spent in medical study in the University of Pennsylvania. In March, 1865, he started via Nicaragua to California. He made a narrow escape with his life in Nicaragua, from an attack of Panama fever. In June he was on the Frazer River, on his way to its extreme headwaters, where at Lake Tatleh, in British Columbia, the headquarters of the telegraph company (in that region) were established. During the winter of 1865–1866 he traveled over 2000 miles on snow-shoes, and penetrated into regions that were practically unknown.

He returned the following spring to Philadelphia, and in 1867 received his medical degree from the University of Pennsylvania. The next two years he held the chair of botany in the State Agricultural College. May 27, 1868, he married Martha, daughter of Addison and Elizabeth May, of West Chester. In the spring of 1869 he located as a physician in Wilkes-Barre, and soon acquired a lucrative practice, which was largely surgical in character. He was one of the most active in founding the Wilkes-Barre Hospital, which has now grown into one of the large institutions of the State.

During the years 1873, 1874 and 1875, Dr. Rothrock was surgeon and botanist to Lieutenant Wheeler's Exploring Expedition west of the 100th meridian. During these years he made large botanical collections in Colorado, Arizona, New Mexico and California. The results of his

field work were published in, and made up the quarto Volume VI of the reports of Lieutenant Wheeler.

In 1877 Dr. Rothrock was elected Professor of Botany in the University of Pennsylvania, which position he still holds, though he has been absent on leave for several years devoting his time and energy to the forestry cause in this State.

In the winter of 1889-90 he made a voyage to the West Indies in his yacht, the "White Cap," and obtained important scientific collections. In June, 1893, he was appointed the first Forestry Commissioner of the State by Governor Pattison. His associate was the venerable and accomplished William F. Shunk. Their joint report was presented to the Legislature of Pennsylvania, March 12, 1895. It may be regarded as being the first attempt at a rational forest policy for the State. On September 14, 1895, Dr. Rothrock was appointed Forestry Commissioner by Governor Hastings.

As a teacher, Dr. Rothrock showed himself at his best. He inspired his pupils with a desire to learn about plants, taking great pains in the laboratory to develop the students' powers of observation to the utmost. If he had a character which predominated, it was thoroughness. Not once did he rest satisfied until he had obtained from a pupil the best results possible under the circumstances. From the outset he not only encouraged, but requested a student to see, think and conclude for himself, often without aid from books and always without unnecessary aid from him. This may appear to many as harsh treatment, but systems of teaching can only be judged by their result, and in this light Professor Rothrock's method stands abundantly

vindicated. How wretched the system of education which "crams" a lad with facts and leaves him unable to stand alone when beyond the authority of the preceptor. To the fullest extent Dr. Rothrock recognized this, and to prevent such a result insisted on mental discipline, which left a student with a well-grounded confidence in his own powers. It is probable that Dr. Rothrock would, himself, regard his relation to the forestry cause of the State as indicating his most important life-work.

The State Forestry Commission Report* makes a volume of nearly 400 pages, and no public document issued by the state in many years contains so much valuable information as this. It gives, in detail, with illustrations and other matter intended to throw light upon the forestry question in this State, the results of the important work done by Professor J. T. Rothrock and Colonel W. F. Shunk, under the Act of May 23, 1893. The illustrations embrace forty-seven plates, showing the conditions existing in the wooded sections of the State and some effects of the forest fires. There are also plates showing the naked hills and rapid drainage, which causes very high and very low water. Colonel Shunk devotes his attention to the water-sheds of the Commonwealth, wild lands from which forest reserves may be selected, and the influence of woods on the flow of streams. Professor Rothrock treats the subject in all its phases. A summary of the contents shows a codification of all the Acts of Assembly relating to forestry, timber lands, trees, etc., the original forest conditions of Pennsyl-

* *Annual Report of the Pennsylvania Department of Agriculture for 1895.* Part II: *Division of Forestry, comprising Report of Pennsylvania Forestry Commission, appointed by Act of Legislature, approved May 23, 1893.* By J. T. Rothrock, M. D., Botanist Member; William F. Shunk, Engineer Member. State Printer, 1896, octavo, 361 pp., 47 plates, 6 maps.

JOSEPH T. ROTHROCK.

UNIVERSITY OF ARIZONA

vania, the waste areas, state forest lands, time and fire as elements in the forestry problem, a table of forest fires, relations of forest to the water supply, table relating to water failure, catalogue of forest trees of Pennsylvania having commercial value, detailed statement of cleared and timber lands by counties, and timber rafted for the last twenty years to Williamsport. Considerable space is given in the report to suggestions as to sections of the State suitable for a forest reserve. In 1894 there were sold in this State no less than 1,509,159 acres for taxes, which aggregated $290,386.13, an area equal to one-nineteenth of the area of the Commonwealth.*

As a lecturer, as connected with the Michaux Lecture Fund of the American Philosophical Society and with the Forestry Association of Pennsylvania, Dr. Rothrock had a pleasing way of reinforcing his remarks by stereopticon views of trees, landscapes and historical places of his own making. His lectures have always been well attended. It should be said of Dr. Rothrock, that in abandoning the field of scientific botany to popularize the forestry cause in Pennsylvania, he did it reluctantly and only on the most absolute conviction of duty, and with the full knowledge that in so doing he was jeopardizing his standing as a botanist. He is a member of the American Philosophical Society and the Philadelphia Academy of Natural Sciences.

A genus of *Asclepiadaceæ*, from lower California, commemorates Dr. Rothrock's services to botany.† His writings are:

* Philadelphia *Ledger*, October 26, 1896.

† *Proceedings American Academy*, XX : (1885) 295. (Rothrockia cordifolia). Also in *Wheeler's Survey Report* Pyrrhopappus Rothrockii, Gray; Halenia Rothrockii, Gray; Stachys Rothrockii, Gray; Towendsia Rothrockii, Gray; Artemisia Rothrockii, Gray; Nama Rothrocki, Gray.

1. "The Morphology of the Andræcium of Fumariaceæ."—*Proceedings of Boston Society Natural History*, IX : 246 (1862).

2. "Revision of the North American Gaurineæ."—*Proceedings of American Academy of Arts and Sciences*, VI : (1864) pp. 347-354.

3. "Sketch of the Flora of Alaska."—*Smithsonian Report*, 1867, pp. 433-463.

4. "Conservation and Correlation of Vital Force."—(*American Naturalist* for 1877?)

5. Volume VI of *Wheeler Survey Reports*, mainly written by Dr. Rothrock, published in 1878. (United States Geological Surveys, West of 100th Meridian.)

6. "Vacation Cruising," 1884.—J. B. Lippincott & Co.

7. "The Fertilization of Flowers."—*American Naturalist*, I : 64.

8. "List of and Notes upon the Lichens collected by Dr. T. H. Bean in Alaska, etc."—*Proceedings United States National Museum* (1884), VII : 1.

In the *Botanical Gazette* the following articles are from the pen of Dr. Rothrock:

9. "Chia." I and II : 17.

10. "A Valuable Work." 18.

11. "A New Preparation for Poisoning Plants." 27.

12. "Damiana." 28.

13. "Diplopappus ericoides." 70.

14. "Sisyrynchium Arizonicum, Rothrock." 125.

15. "Chimaja." 126.

16. "Poisonous Properties of Leguminosæ." 133.

17. "A Convenient Microscope." III and IV : 37.

18. "Staining and Double Staining Vegetable Tissues." 201.

19. "The Colorado Berberis." 242.

20. "How to make Permanent Botanical Objects for the Microscope." V and VI : 27.

21. "Notes on Modes of Work in the Laboratory of Professor De Bary in Strassburg." 193, 204.

22. "Home and Foreign Modes of Teaching Botany." 233.

23. "A Reply to Emesby." VII and VIII : 8.

24. "Eriodictyon glutinosum as Indicating Evolution." 184.

25. "The Arizona Potato." 208.

25*a*. "Dr. George Martin." XI : 338.

He has been a constant contributor to *Forest Leaves*, the official organ of the Pennsylvania Forestry Association, as follows:

26. "Tree Growth as Determined by Location." II : 18.
27. "The Chestnut Tree." II : 35.
28. "Brandywine Banks above the Ford." II : 50.
29. "Concerning Our Sassafras Trees." II : 67.
30. "Pinus rigida on the Dunes at Cape Henlopen." II : 83.
31. "Along the Coast Northward." II : 99.
32. "The Row Farm Walnut Tree." II : 133.
33. "Red Cedar, Savin." II : 148.
34. "Mangroves." III : 5.
35. "The Old Field or Loblolly Pine." III : 25.
36. "The Tulip Poplar, or Poplar Tree." III : 85.
37. "The Buttonwood." IV : 5.
38. "The Over Cup Oak." IV : 22.
39. "The Black Walnut." IV : 38.
40. "Our Shell-bark Hickory." IV : 56.
41. "The Persimmon." IV : 72.
42. "The Forest Primeval." IV : 88.
43. "The American, or White Elm." IV : 104.
44. "The White Ash." IV : 120.
45. "White Pine." IV : 152.
46. "The Hemlock." IV : 169.
47. "River Birch." IV : 185.
48. "Fire and Flood." V : 8.
49. "The Rock Oak." V : 25.
50. "The Beech." V : 40.
51. "The Sugar Maple." V : 56.
52. "The Locust Tree." V : 72.
53. "The Bitter Nut Hickory." V : 89.
54. "The Swamp White Oak." V : 104.
55. "The American Linden." V : 136.
56. "Red Pine, Norway Pine." V : 152.
57. "Silver Maple, White Maple, Soft Maple." V : 168.
58. "Kentucky Coffee Tree." V : 184.
59. "Nyssa sylvatica." VI : 8.

60. "Iron Wood, Hop-Hornbeam." VI : 40.

61. "Tree Form and Tree Photography." VI : 72.

62. "Carya tomentosa." VI : 88.

63. "Rock Oak, Rock Chestnut Oak." VI : 104.

64. "Pin Oak." VI : 121.

65. "Red Maple." VI : 137.

66. "Yellow Birch." VI : 152.

67. "Black Birch." VI : 169.

68. "The Red Spruce." VI : 184.

69. "Honey Locust." VI : 201.

70. "Swamp Magnolia." VII : 8.

71. "Big White Oaks." VII : 24.

72. "A Pennsylvania Sequoia." VII : 24.

73. "The Black Spruce." VII : 40.

74. "The Origin of Floral Structures. Review of Rev. George Henslow's Book."—*The American.*

75. "Some Observations on the Bahamas and Jamaica."—*Proceedings American Philosophical Society*, XXIX : 145.

76. "A Monstrous Specimen of Rudbeckia hirta."—*Contributions Botanical Laboratory University of Pennsylvania*, I : 3.

77. "A Nascent Variety of Brunella vulgaris."—*Contributions Botanical Laboratory University of Pennsylvania*, I : 64.

78. "A Rare Buttonwood."—*Garden and Forest*, III : 69.

79. "The Action of Root Hairs, Illustrated."—*Garden and Forest*, III : 94.

80. "Poisonous Properties of the Leguminosæ."—*Proceedings Academy of Natural Sciences*, 1877, 274.

81. "Relation of the Medullary Rays to the Strength of Timber."—*Proceedings Academy of Natural Sciences*, 1884, 14.

82. "The Internal Cambium Ring in Gelsemium sempervirens.—*Proceedings Academy of Natural Sciences*, 1885, 22.

83. "Mimicry Among Plants."—*Proceedings Academy of Natural Sciences*, 1888, 12.

84. "Remarks on Death of Professor Asa Gray."—*Proceedings Academy of Natural Sciences*, 1888, 62.

85. "The Sand Dunes of Lewes, Delaware."—*Proceedings Academy of Natural Sciences*, 1889, 134.

86. "Report of the Department of Agriculture of Pennsylvania. Part II. Division of Forestry." 1895, Harrisburg, Pennsylvania. Octavo, 361 pages. Illustrated.

87. "Third Annual Report of the Pennsylvania Department of Agriculture. Part II. Division of Forestry." Wm. Stanley Ray, State Printer. Octavo, 309 pages, 21 figures, 12 plates.

CHARLES McILVAINE.

Charles McIlvaine, son of Hon. Abraham R. McIlvaine and Anna (Mulvaney) McIlvaine, was born on Springton Farm, part of the old Penn Manor of Springton, on the 31st of May, 1840.

The McIlvaine family were of Scotch-Irish extraction. In 1529 they were the Lairds of Gremit, and a powerful Sept of the House of Kennedy—the Earls of Casilis. James McIlvaine, from whom the subject of this sketch is descended, emigrated from County Antrim, Ireland, and settled near Chester, in the year 1740.

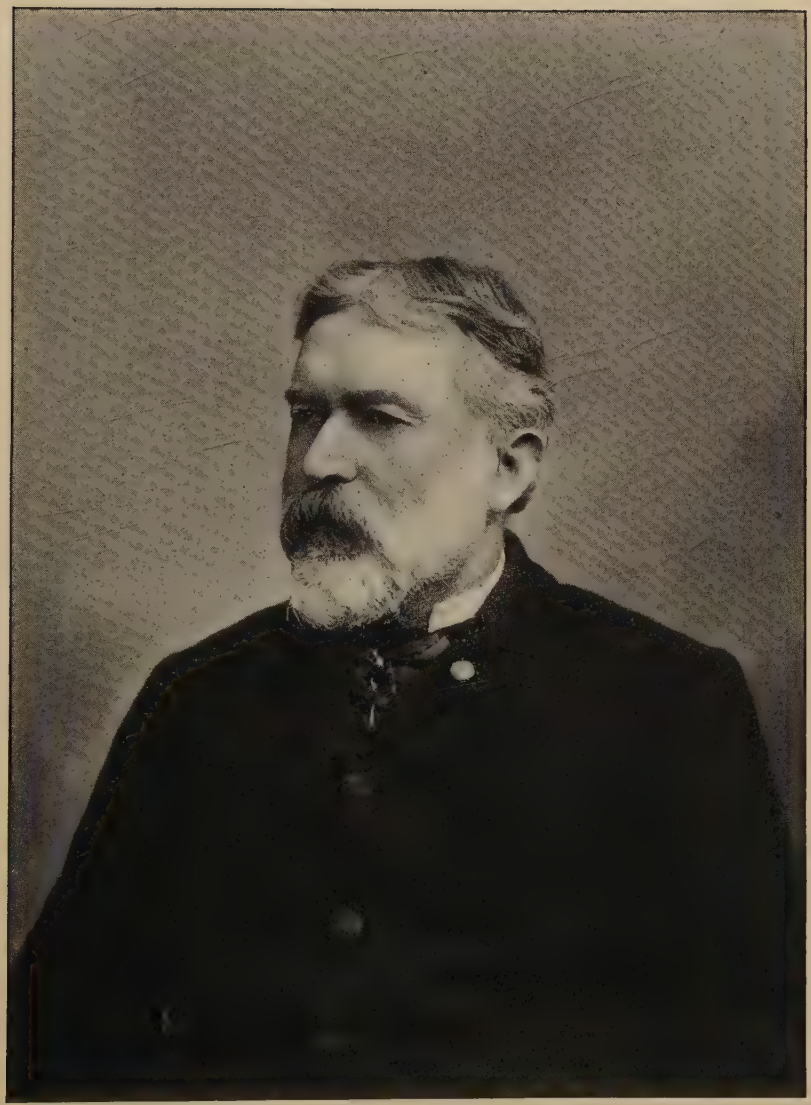
Abraham R. McIlvaine, father of Charles, was a patriotic and public-spirited citizen. He represented Chester County in the State Legislature in 1836; was a member of the Electoral College of Pennsylvania in 1840, casting his vote for General Harrison for President, and represented the Seventh Congressional District in Congress from 1842 to 1846, inclusive. During his whole active life he was a pronounced Unionist, and at the breaking out of the late war encouraged his son Charles, then division engineer on the East Brandywine & Waynesburg Railroad, to aid in the suppression of the Rebellion, his own delicate health and age alone preventing him from going to the field himself.

Charles McIlvaine, though only just of age, raised a company of volunteers, of which he was elected captain,

and was mustered into the service of the United States in October, 1861. He united his company with the Ninety-seventh Regiment of Pennsylvania Volunteers as Company H. Captain McIlvaine filled many important staff and military positions, and served his country with distinction and bravery, until compelled to resign on account of ill-health on June 10, 1863.

His early education was received at the hands of private teachers and at the public schools of Indian Town and Brandywine Manor. He afterwards spent eighteen months at the Northwest Grammar School of Philadelphia, but was compelled to leave there at the age of thirteen because of failing health. Being fond of reading and study, he has been a hard student since that age, and may be called a self-educated man.

With the exception of letters written upon art matters while in Europe in 1873 and 1874, Captain McIlvaine published but little until 1881, when he became a contributor to the *Detroit Free Press*, in which he has published many humorous poems and prose sketches, in the dialect of the West Virginia mountaineers, under his *nom de plume* of "Tobe Hodge." The "Tim Price" yarns and "Powerful Temperance," humorous sketches, and the stories of the "The Twins of Weasel Branch," "The Ghost of Aaron's Prong," and "The Waifs of Fighting Rocks," met with great popular favor. Under his *nom de plume* and proper name he has contributed to nearly all the leading American magazines, and is, under his proper name, a well-known writer upon scientific subjects—edible and non-edible fungi being his specialty. *Puck*, *Judge*, and Harper's publications and others, published much of his humorous work, signed



CHARLES McILVAINE.

UNIVERSITY OF ARIZONA

and unsigned. His story, entitled "A Legend of Polecat Hollow," which originally appeared in *The Continent*, has been re-published in England in book-form, where it has had a large sale. He excels as a writer of humorous and dialectical poems, and as a writer of short stories he has had excellent success.

Since 1881 Captain McIlvaine has indefatigably devoted himself to determining, by experiments upon himself, which of the many hundred varieties of toadstools are suitable for food, which are not, and which of the latter either contain matter injurious to the human system, minor poisons, or poisons deadly in effect. He has thus tested nearly five hundred species. The most important of Captain McIlvaine's discoveries is to be found in an article entitled, "Amanitin and its Antidote," published in *The Medical and Surgical Reporter*, December 12 and 19, 1885, and afterward embodied in an article "The Deadly and Minor Poisons of Toadstools," in *The Therapeutic Gazette*, May 15, 1893, which was re-printed in pamphlet form. These articles clearly demonstrate that atropin is the antidote to the terrible, deadly poison of the *Amanitæ*. He has in course of preparation an important book, entitled: "Eight hundred American Fungi, Mushrooms, Toadstools." In it 750 edible forms are described, and sixty poisonous or suspected plants. Recipes for cooking the edible ones are also to be added. The value of Captain McIlvaine's work, in a field in a which he stands pre-eminently alone, lies in the correction of the many existing fallacies relating to toadstools; the segregation of edible species from those which are harmful, and the confirmation of by far the greater number of varieties as wholesome, palatable, plentiful food.

HORATIO C. WOOD.

Horatio C. Wood,* M. D., Professor of Materia Medica and Therapeutics, and Clinical Professor of the Diseases of the Nervous System in the University of Pennsylvania, Physician to the Philadelphia Hospital, and member of the National Academy of Science, etc., was born January 13, 1841, at Philadelphia. He was the son of Horatio C. Wood, Sr., and Elizabeth H., daughter of John Bacon, for many years Treasurer of the City of Philadelphia. He was descended on his father's side from Richard Wood, who emigrated from Bristol, England, in 1682 or 1683, and settled in Philadelphia. The family afterward removed to New Jersey, the generation preceding Dr. Wood returning to Philadelphia. He is a nephew of the late Dr. George B. Wood, who died childless. Intermingled with the English blood is a Scotch strain, coming down, according to the genealogical researches by Mr. Gideon Scull, of England, from a brother of Robert Bruce, of Scotland. Dr. Wood developed a fondness for natural history early in life. His literary education was received at Friends' Schools, among the most notable of which was the Westtown Boarding School, near West Chester, Pennsylvania. The natural bent of his mind was toward professional studies. He studied medicine at the University of Pennsylvania, and received his degree in March, 1862. But before he entered upon his medical course, he had become an earnest worker at the Academy of Natural Sciences of Philadelphia, and distinguished himself in the scientific field by original work. His first original paper, published when he was nineteen years old, appeared in the *Proceedings of the*

* *Therapeutic Gazette*, 1884.

Academy for 1860. It was entitled, "Contributions to the Carboniferous Flora of the United States, and Catalogue of the Carboniferous Plants in the Museum of the Academy, with Description of Three New Species."

Immediately after graduating in medicine, Dr. Wood was appointed one of the resident physicians of the Philadelphia Hospital, where he remained one year, after which he served a similar term at the Pennsylvania Hospital, spending, during the war, considerable time in the military hospitals in and about Philadelphia and Washington. He commenced the active practice of his profession in Philadelphia in 1865. He now began the special work in therapeutics and materia medica, but still continued his natural history studies, and published several papers on natural science, especially on histological botany. His chief botanical work, "Prodromus of a Study of North American Fresh-water Algæ," which long remained the standard work on the subject, until the work of Wolle appeared, was published June 18, 1869.

In 1866 Dr. Wood was appointed by the Trustees of the University of Pennsylvania, Professor of Botany in the Auxiliary Faculty of Medicine, which had been established and endowed by his uncle, Professor George B. Wood. About 1870 he began to study especially nervous diseases, and on the organization of the new university hospital, in March, 1874, he was appointed Clinical Lecturer on Nervous Diseases, which position, in 1875, was made a professorship by the Trustees of the University. In 1870 he was appointed one of the visiting physicians of the Philadelphia Hospital, and since 1872 he has given his attention solely to the science and art of medicine, abandoning entirely his general

natural history studies. In 1876, on the death of Professor Joseph Carson, he was chosen Professor of Materia Medica and Therapeutics in the Medical Department of the University of Pennsylvania, soon after which he resigned the chair of botany in the Auxiliary Faculty of Medicine.

Dr. Wood made his debut in the journalistic field July, 1871, as the editor of *New Remedies*, published in New York by William Wood & Company, in which position he continued until January, 1873. In 1873 he became editor of the Philadelphia *Medical Times*, published by J. B. Lippincott & Company, resigning this position in 1873. Professor Wood is the sole editor of the latter half of the fourteenth edition of the "United States Dispensatory," and his able revision of the fifteenth edition, in company with Professors J. P. Remington and Sadtler is well known.

The success of this has exceeded that of any previous edition of the book, about 15,000 copies of it having been sold in a twelve-month. Dr. Wood's brochure on "Brain Work and Over Work," in 1879, has been read with interest by the general practitioner all over the land; and the same may be said in regard to a volume entitled "Food for Invalids," published in conjunction with Dr. Fothergill, of London, in 1880.

But the work which crowns the effort of his life is the "Treatise on Materia Medica and Therapeutics," published in 1875, the fifth edition in 1883. This was the first one published in the English language, in which the physiological action of drugs was brought prominently forward as a ground-work of a treatise on therapeutics.

Dr. Wood has been connected as active or honorary member with the following learned bodies: Lyceum of

Natural History, of New York; American Medical Association, American Philosophical Society, Société d'Hygiène, Paris; Amer. I. Sci. Kwai, Japan (Tokio). He is still actively engaged in the practice of medicine, and as a professor in the most prominent medical school of the country occupies an exalted place among professional men.

USELMA C. SMITH.

Uselma C. Smith, a local botanist of repute, was born June 9, 1841, in the West, where his parents had removed from Philadelphia. He was educated in the public schools of the Western Reserve. He studied law and was admitted to the bar January 16, 1864. In August, 1868, he was elected a member of the Academy of Natural Sciences of Philadelphia, and as the Solicitor, Member of the Council and Chairman of the Finance Committee takes an active interest in the welfare of the institution. After the lamented death of Dr. J. B. Brinton, Mr. Smith was elected President of the Philadelphia Botanical Club, an institution of working botanists, founded by Dr. Brinton.

ADOLPH WILLIAM MILLER.

Adolph William Miller* was born, October 8, 1841, at Berge, in the former Kingdom of Hanover (now a province of Prussia), in a building occupied as a pharmacy by his father, William H. Miller; this store being a branch (Filial Apotheke) of the one belonging to his maternal grandfather, Franz von Lengerken, at Ankum, some three miles distant. He came to this country with his parents in the fall of 1848, at the age of seven years. Landing at New Orleans,

* Published in *Alumni Report* (Philadelphia College of Pharmacy), XXXII: p. 79. January, 1896, with portrait.

after a tedious voyage in a sailing vessel, the family ascended the Mississippi on a very slow steamboat, and reached St. Louis about Christmas. His father purchased a property in Belleville, St. Clair County, Illinois, some fourteen miles east of St. Louis, and there opened a drug store. Young Adolph attended the public schools in Belleville for five years, and also received private instruction in Latin, French and German.

At the age of twelve he entered the store of Edward T. Robinson, at the southwest corner of Fourth and Market Streets, St. Louis, Missouri. Mr. Robinson had then but recently graduated from the Philadelphia College of Pharmacy, having been apprenticed to the well-known firm of Bullock and Crenshaw. Mr. Miller remained here for nearly four years, the store in the meanwhile passing into the hands of Robert Parham and Samuel W. Hendel—both of them former Philadelphians. Mr. Hendel was also a graduate of the Philadelphia College of Pharmacy, having been employed in the store of Henry C. Blair.

In the meanwhile, the father, W. H. Miller, had sold his property in Belleville, and opened a drug store in the then frontier post of St. Paul, Minnesota, where he was joined, in 1857, by his son. While assisting his father, he continued his studies in Latin, Greek and mathematics in the College of St. Paul. On account of the high praise which had so frequently been bestowed on the Philadelphia College of Pharmacy by all of his former employers, Mr. Miller early resolved to avail himself of its teaching resources. With the opening of navigation in the spring of 1860—there being no railroads in the Territory of Minnesota at that time—he descended the Mississippi to St. Louis,

ADOLPH W. MILLER.

UNIVERSITY OF ARIZONA

came by rail to Philadelphia, and found employment in the drug store of Ferdinand Roller, at the southeast corner of Twelfth and Mt. Vernon Streets, and subsequently with Henry O. D. Banks, at Fourth and Callowhill Streets. Mr. Miller graduated from the Philadelphia College of Pharmacy in 1862, the age qualifications then not being rigidly insisted upon.

Immediately after graduating, and before being of age, he was offered a partnership with his former employer, the firm then being styled Henry O. D. Banks & Company. Some three years later, Mr. Banks retired, and the remaining partners established the new firm of Aschenbach & Miller, which has continued in business to the present time, although its establishment was removed to the northwest corner of Third and Callowhill Streets.

Without any intention of changing his profession, Mr. Miller resolved to study medicine, chiefly for the educational advantages connected therewith. As every successive course of lectures in the medical colleges, at that time, was an exact repetition, he decided to have, at least, the benefit of the different views entertained by the then most prominent teachers. He therefore matriculated in 1869 at the Jefferson Medical College, where he attended one full course of lectures. His next regular course was taken at the University of Pennsylvania, then occupying the site where the Philadelphia Post-Office is now located, from which he graduated in medicine in 1871. He then continued a series of studies in the Auxiliary Department of Medicine of the University, receiving its diploma as Ph. D. in 1872. He has also received the honorary title of D. O. from the Mt. Vernon Institute of Elocution and Languages of this city.

Shortly after the establishment of a pharmaceutical laboratory in the medical department of the University of Pennsylvania, Dr. Miller was elected Demonstrator of Pharmacy, which position he has held continuously. Some ten years ago he was also appointed Lecturer on Materia Medica in the University, which office he also still holds.

Dr. Miller has been President of the Alumni Association of the Philadelphia College of Pharmacy, and a most active member; President of the Alumni Association of the Auxiliary Department of Medicine of the University of Pennsylvania; President of the Alumni Association of the National School of Elocution and Oratory, and he is at present President of the Lotus Club, Corresponding Secretary of the Philadelphia College of Pharmacy, and President of the Botanical Society of Pennsylvania. He has also been President of the Eisner and Mendelson Company, of New York, from the time of its incorporation.

Dr. Miller was married to Margaretta T. Ash, of Philadelphia, the ceremony being performed by Mayor Alexander Henry. He has three daughters living, one of whom is married to William C. Helweg, and another to Alden H. Weed, both of this city.

ISAAC C. MARTINDALE.

Isaac C. Martindale* was born in Byberry, Philadelphia County, Pennsylvania, July 15, 1842. His parents belonging to the Society of Friends, his early education was acquired chiefly in the Quaker schools. He began the study of natural history while on the parental farm, and in the absence of books he acquired considerable scientific knowl-

* 1895. *Torrey Botanical Bulletin*, XX: 98.

edge by close application. He left the farm and became a clerk in a bank at Byberry. In 1875 he became Cashier of the National State Bank of Camden. Later, when the Camden National Bank was established, the cashiership was confided to him. He was for some years Treasurer of the Academy of Natural Sciences of Philadelphia, a position in which his financial ability made him eminently useful.

The study of botany was to him a welcome relaxation. He acquainted himself with the plants in the vicinity of Byberry, and in a short trip to Europe his eyes were delighted by the mountain flora of Switzerland. After his removal to Camden, close proximity to the rich and peculiar flora of the "Jersey Pines" opened to him a new field, in the study of which he profited by the companionship and accurate local knowledge of the lamented Charles F. Parker. With most assiduous effort, most untiring industry, and with a large outlay of money, he increased and perfected his herbarium, which had few, if any rivals, among the private collections in the land.

He published in the *American Naturalist* (November, 1879), a list of plants collected on an excursion with some members of the American Association for the Advancement of Science, to the vicinity of Pike's Peak in 1878. In 1880 he read before the West New Jersey Surveyor's Association a paper entitled "Notes Upon the Bartram Oak" (*Quercus heterophylla*), with a summary of the literature.

There appeared in the *Proceedings of the Philadelphia Academy of Natural Sciences*, for 1880, a short paper on "Sexual Variations in Castanea Americana." Mr. Martindale had time to prepare a "list of the marine algæ, hitherto observed on the coasts of New Jersey and Staten Island,"

which was published in the first volume of the "Memoirs of the Torrey Club." His studies of the ballast plants also deserve notice in speaking of his botanical work. He wrote a very just and feeling biographical sketch of his friend, Charles F. Parker, who had died the previous September.*

Mr. Martindale also devoted himself to other sciences. Entomology received a share of his attention, and in 1863 he was made a corresponding member of the American Entomological Society. He devoted himself to the study of the Lepidoptera, and made a collection which experts in that department have pronounced as one of the finest in America. He interested himself in meteorology, and was one of the observers for the Smithsonian Institute.

He also investigated the history of his native town (Byberry), and studied his family genealogy.

It is to be feared that Mr. Martindale over-taxed his strength, and, perhaps, had he shortened his hours of labor he might have been spared to the world for many years longer. Symptoms of failing health led him to resign his position within a week or two before his death, in order that he might be restored by travel.

Commencing his study of plants at the time that systematic botany alone seemed to engage almost the entire attention of botanists, Mr. Martindale's collections soon secured him an acquaintance with the recognized botanical authorities.

The herbarium† was commenced in his early manhood, and its collection and arrangement occupied at least

* *Proceedings of Academy of Natural Sciences*, Philadelphia, November, 1883.

† *American Journal of Pharmacy*, LXVI: 251. May, 1894.

twenty-five years. During a great portion of this time he enjoyed the friendship and assistance in this work of Charles F. Parker. The collection consisted of seven large walnut cases, compactly filled with mounted specimens. "It is impossible to form any definite idea of the number of plants contained, as on many of the sheets several specimens are attached from different localities. The specimens are all handsomely mounted on white paper, and properly arranged in heavy manila paper genus covers, and in natural order divisions, the plan of arrangement adopted being that of Durand's Index, corresponding with the nomenclature of the Genera Plantarum of Bentham and Hooker.

"Every division of systematic botany is well represented. Not only the Phanerogamia or flowering plants, but the Pteridophyta, including a magnificent collection of ferns; the mosses and liverworts, and the Thallophyta are represented by a collection of algæ, fungi and lichens. It was the aim of Mr. Martindale to make his collection complete and a representative herbarium, and it is universally acknowledged as surpassing, both in numbers and in the perfection of style and arrangement, any private collection in America.

"His proximity to and knowledge of the peculiar flora of the pine barrens of New Jersey, gave him a fund of material valuable for exchanges, and he was not slow to take advantage of this in obtaining valuable specimens to complete his own collection. His correspondence and exchanges were numerous, including such countries as Canada, Brazil, England, France, Germany, Austria and Scandinavia, and the flora of these are represented in the

herbarium. Mr. Martindale paid considerable attention to the peculiar and miscellaneous plants of the ballast grounds, and this class, difficult of study to the ordinary student, because not contained in our local manuals, is likewise well represented.

"In addition to making extensive collections himself, and exchanging with numerous botanists, both at home and abroad, he acquired, by purchase, the best collections offered. No collector submitted a list of desirable plants but that he was made happy by an order from Mr. Martindale, and he was a liberal contributor to every botanical expedition. Among the many noted American collectors, whose collections are here represented, may be mentioned: Parry, Garber, Lemmon, Rothrock, Rusby, Curtiss, Howell, Reynolds, Palmer, and those magnificent collections made in the southwestern states and territories and in Mexico, by C. G. Pringle.

"In 1881 he purchased the herbarium of Dr. Ferdinand Rugel, of Tennessee, which was replete in the representation of the flora of the southern states, thus receiving a large addition to his already extensive collections from this region. These specimens were remounted and distributed through his herbarium. A great part of the herbarium of his friend and co-laborer, Charles F. Parker, who had made a special study of the flora of New Jersey, is preserved in this collection. Likewise the collections of C. F. Austin.

"No expense was spared to make his herbarium complete and perfect in every respect, and the outlay was large. It is estimated that in the collection and arrangement of this magnificent herbarium, Mr. Martindale had spent at least $15,000.

"Beyond any statement of the money value of the herbarium, its true value will be in its importance to scientific study and future investigations. Mr. Martindale's studies brought him in contact with the botanical teachers and authorities, and numerous are the specimens bearing the labels of such eminent botanists as Dr. Asa Gray, John M. Coulter, Sereno Watson, Dr. N. L. Britton, Professor E. L. Greene, Dr. Vasey, Professor Macoun, Professor Underwood, Dr. Porter and William Canby.

"The specimens and various genera or orders, difficult of determination, have been very generally submitted to specialists in the various departments, and their notes and reference will add materially to the value of this collection. Many of the composites were examined and determined by Dr. Gray while preparing the volume of his Synoptical Flora of North America, covering that order.

"In the catalogue of the plants of New Jersey, forming part of the geological survey of that state, Professor N. L. Britton frequently refers to the herbarium of Mr. Martindale as authority for statements made."

It is the intention of the Philadelphia College of Pharmacy, to whom the herbarium was presented through the liberality of Messrs. Smith, Kline, French & Company, to preserve the Martindale Herbarium intact as a reference herbarium, and, under proper regulations, it will be open to visiting botanists for study and consultation.

Bibliography.

1. "Variation in Leaves."—*Botanical Gazette*, I: 46.

2. "The Introduction of Foreign Plants."—*Botanical Gazette*, II: 55.

3. "Ferns from Rock Castle Spring, Kentucky."—*Botanical Gazette*, II: 62.

4. "More about Ballast Plants."—*Botanical Gazette*, II : 127.

5. "Orobanche minor in New Jersey."—*Botanical Gazette*, III–IV : 73.

6. "Germination and Growth of Parasitic Plants."—*Botanical Gazette*, V–VI : 38.

7. "Quercus heterophylla."—*Botanical Gazette*, V–VI : 303.

8. "Osmunda cinnamomea var. frondosa."—*Botanical Gazette*, VII–VIII : 86.

9. "Sudden Appearance of Plants."—*Torrey Botanical Bulletin*, VI : 105.

10. "Opuntia vulgaris, a New Jersey Plant."—*Torrey Botanical Bulletin*, VI : 105.

LINNÆUS FUSSELL.

Linnæus Fussell, M. D., son of Dr. Edwin Fussell, of Delaware County, a leading and well-informed botanist, and one of the most active observers, constantly giving attention to the study of plants, was born September 2, 1842. At present he is President of the Biological Section of the Delaware County Institute of Science.

A. F. K. KROUT.

A. F. K. Krout was born in the village of Line Lexington, in New Britain Township, Bucks County, Pennsylvania, February 2, 1843.

He was educated in the public schools of Bucks County, and received his academic training at the North Wales Institute, in Montgomery County.

His principal work has been teaching. He first taught in the public schools of Bucks County, after which he held the position of Supervising Principal of the following borough schools in Pennsylvania: Coplay, Lehigh County; Emlenton, Venango County; Lehighton, Carbon County; Wyoming, Luzerne County.

In June, 1883, he gave up teaching to become the Corporation Accountant and Cashier for the Coplay Iron Com-

pany, a corporation owned principally and controlled by Mr. E. P. Wilbur, former President of the Lehigh Valley Railroad Company. This position he held for five years, after which he resumed his professional work in the Borough of Emlenton. In 1876 he appeared before the State Board of Examiners for the Normal Schools, passed the examination successfully, and became an authorized teacher of didactics.

He became a resident of Philadelphia in 1892, when he took charge of the Business Departments of Temple College, Broad and Berks Streets, and of the Union College of Business, Broad and Market Streets.

He found much pleasure in pursuing a course of general studies in science and language, and in 1877 Franklin and Marshall College recognized his industry as a student, and conferred on him the degree of Master of Arts.

Having the confidence of the people at his permanent home in Coplay, he was frequently called upon to fill positions of honor and responsibility. He was the first commissioned Magistrate when that town became a borough, which office he held from 1869 to 1890. He was Secretary of Town Council for thirteen years and School Director five years.

The judges of the courts frequently appointed him to serve on road juries and commissions, and there are few townships in Lehigh County in which he was not called to execute these appointments.

His favorite study since 1869 has been botany. When not in the class-room he has been out in the fields. When he came to Philadelphia he prepared himself further in botany, by taking, for three years, the special course for teachers in botany and zoology at the University of

Pennsylvania. The work done in the botanical line may here be mentioned:

1. "The Flora of Lehigh County, Pennsylvania," in conjunction with Dr. William Herbst, the eminent mycologist, who is still a resident of the County. The greater part of the Lehigh collection is deposited in the Herbarium of the Philadelphia Botanical Club at the Academy of Natural Sciences of Philadelphia.

2. "The Grasses of Philadelphia," 1898. These were contributed to Dr. Thomas C. Porter's Pennsylvania Herbarium at Lafayette College, Easton, Pennsylvania.

3. "The cataloguing of the Bartonian Collection when deposited with the Academy of Natural Sciences by the Philosophical Society in 1897." This collection contains the plants collected by Pursh on his memorable trips from Philadelphia to the high mountains of North Carolina, and to the Great Lakes and the White Mountains, in 1806 and 1807.

Professor Krout is a member of the Biological Society and the Pennsylvania Botanical Society at the University. At the Academy of Natural Sciences he is a member of the Botanical Section, Microscopical and Biological Sections, Philadelphia Botanical Club, the Pennsylvania Mycological Society, and is now President of the Philadelphia Moss Chapter.

EDSON SEWELL BASTIN.

Edson Sewell Bastin was born May 29, 1843, in Azaukee County, Wisconsin. His father was one of the pioneer farmers of what was then a new territory, a hardy, industrious man, with little more than a district school education, but well endowed with hard sense and pluck.

Edson's mother was a sweet-natured woman, domestic in her tastes, quiet in her manners but keenly observant, and though not a botanist in the scientific sense, a lover of flowers and with a mind well stored with plant lore. At the age of twelve the boy's heart was saddened, almost broken, by the death of his mother. It was indeed an irreparable loss, though three years afterwards when the father re-married, the children learned to love and revere their step-mother, whose affectionate nature and nobility of character once more made their home a cheerful and happy one. The boy led the usual life of a farmer lad in those days, attending district school in the old log school-house in winters, and helping at farm work in summer time until about sixteen years of age, when he was sent away to school at Carroll College, in Waukesha.

His patriotism was deeply stirred by the events of 1862, and stopping midway in his college course, he enlisted as a private in the 28th Wisconsin Infantry in August of that year, and in December went with his regiment to the front. He participated in the stirring campaigns against Vicksburg and Arkansas Post, fought in the battle of Helena, and marched with General Steele to the capture of Little Rock. He had suffered much in health from the malarial climate and the severe exposure incident to camp life, and soon after reaching Little Rock applied for and secured a clerkship at headquarters, where he found employment suited to his tastes, and the opportunity to regain his accustomed physical vigor. He must have impressed his superiors favorably, for at the end of a year, at the re-organization of the Fourth Arkansas Cavalry, he was appointed a Captain in that

regiment. At the close of the war, although recommended by an examining board of officers for a cadetship at West Point, he determined to leave the military service, partly because, on account of his father's death, affairs at home needed his attention, and partly because he had no relish for a military career.

He was determined, however, to obtain, if possible, a liberal education, and so in the autumn of the same year, 1865, he resumed his collegiate course, this time at the University of Chicago. From this institution he was graduated in 1867. He then spent three years in the study of theology only to reach the conclusion at the close of his course, that he knew less of the subject than he thought he knew at the beginning. These studies were therefore laid aside, and the young man began to take a deeper interest in things demonstrable.

Wearied by close application to books, with health considerably impaired, and not a little disappointed at the outcome of his years of study, he gave up the idea of entering a profession, and determined to go into business. Ere long the opportunity presented itself, and he entered a drug store and began the study of pharmacy. His love of plants, first learned at his mother's knee, and rekindled by his course in botany at college, brief and unsatisfactory as this was, now received a new stimulus. He began with collecting and studying native medicinal plants, but his enthusiasm soon carried him much beyond this, and it was not long before he had identified the larger proportion of the local phænogamous plants. In fact, his drug business received a much larger share of attention on its scientific than on its financial side. It consequently languished, and

before three years had passed its discouraged young proprietor had sold out.

With the feeling that, after all, business was not to be his life occupation, his attention now began to be turned toward the teacher's profession. After giving instruction in common school branches for a year or more, he was offered by Chancellor Burroughs, for whom he entertained a strong affection, the position of Registrar of his Alma Mater, the University of Chicago. This was gladly accepted in the hope that it would afford him the coveted opportunities for pursuing his scientific studies, the taste for which had been rendered keener still by perusal of the works of Darwin, Wallace, Huxley and Tyndall. This was in the year 1874. It happened not long afterwards that the University wanted a teacher for a class in botany, and as the young registrar's interest in the subject was now well known to the trustees, he was asked to take charge of the class, which he did with such success, that in two years he was elected to the chair of geology and botany. This position he held until 1883, when, owing to differences between the President of the University and himself on the doctrine of evolution, he resigned.

Some years previous to this event, however, he had been giving lectures on botany in the Chicago College of Pharmacy, and, as this institution developed rapidly, he undertook the additional work of instruction in materia medica and devoted now his entire time to the development of these departments. One of the results of his work was the establishment of a botanical laboratory, the first of its kind connected with an independent College of Pharmacy in this country.

In 1890 Professor Bastin accepted the chair of materia medica and botany in the Northwestern University School of Pharmacy, where he also organized a new botanical and microscopical laboratory. But this had only just been accomplished when he was called to the Philadelphia College of Pharmacy to occupy the position vacated by the death of Professor John M. Maisch. After coming to Philadelphia, in 1894, Professor Bastin's department was extended by the organization of a large and thoroughly equipped laboratory for the study of micro-botany and pharmacognosy. The professor was identified with the purchase of the herbarium of the late Isaac C. Martindale, a collection especially rich in the local plants of Philadelphia and vicinage. Professor Bastin allied himself with the botanical interests of Philadelphia, and, it was to have been hoped that he would have been spared to continue with the same energy his botanical labors, but after a short illness death claimed him on April 6, 1897.*

Bibliography.

1. "Elements of Botany." 1887.

2. "Vegetable Histology." 1887.

3. "College Botany." 1889.

4. "Questions on College Botany." 1892.

5. "Laboratory Exercises in Botany." 1895.

6. "A Fact Bearing upon the Evolution of the Genus Cypripedium." —*Proceedings of the American Association for the Advancement of Science*, 1883, 310.

7. "Plant Hairs."—*Western Druggist*, 1884.

8. "Sanguinaria Canadensis."—*Pharmacist*, 1885.

9. "Starches of Root and Rhizome Drugs."—*The Apothecary*, 1893.

10. "Economic Botany."—*American Journal of Pharmacy*, 1894, 282.

11. "Starches in Different Commercial Varieties of Cacao."—*American Journal of Pharmacy*, 1894, 369.

* See Obituary Notice, with cut, Philadelphia *Ledger*, April 7, 1897.

12. "Structure of Asarum Canadense."—*American Journal of Pharmacy*, 1894, 574.

13. "Structure of Geranium maculatum.—*American Journal of Pharmacy*, 1894, 516.

14. "Structure of Heuchera Americana."—*American Journal of Pharmacy*, 1894, 467.

15. "Stucture of Podophyllum."—*American Journal of Pharmacy*, 1894, 417.

16. "Structure of our Cherry Barks."—*American Journal of Pharmacy*, 1895, 435.

17. "Structure of our Hemlock Barks."—*American Journal of Pharmacy*, 1895, 356.

18. "Structure of Veratrum viride."—*American Journal of Pharmacy*, 1895, 196.

19. "Structure of Iris."—*American Journal of Pharmacy*, 1895, 78.

20. "Some Further Observations on the Structure of Sanguinaria Canadensis."—*American Journal of Pharmacy*, 1895, 4.

21. "A Contribution to the knowledge of some North American Coniferæ. With Professor Henry Trimble."—*American Journal of Pharmacy*, 1896. Published separately in pamphlet form.

WILLIAM POWELL WILSON.

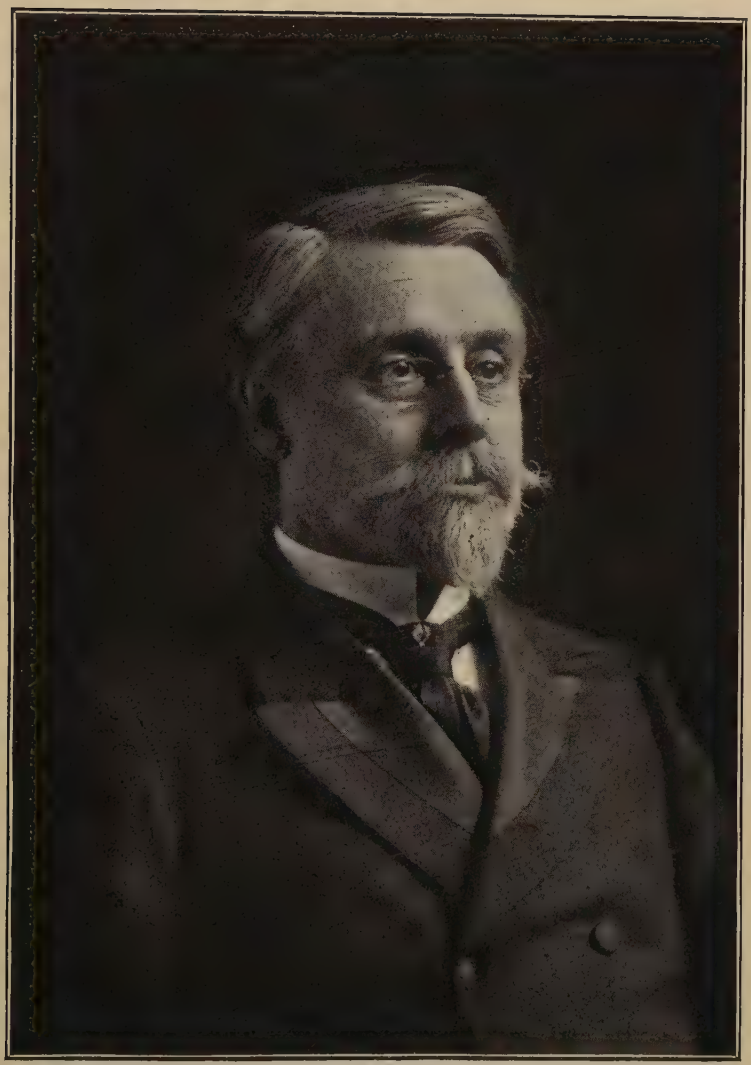
William Powell Wilson, Sc. D., was born October 17, 1844, at Oxford, in Oakland County, in the northern wilds of Michigan. His early life was spent on a farm. When about sixteen years of age he was employed in a large agricultural implement manufacturing establishment, starting at the very beginning, and working gradually upward from the moulding room to the more difficult operation of making complex agricultural machinery. During this time, until he was nineteen years of age, Dr. Wilson was self-taught, applying himself assiduously to the studies ordinarily comprised in a high school course. At nineteen he taught his first district school in Michigan. At twenty he entered the State Agricultural College of Michigan, working his way through that institution for the next two and a half years.

The sessions of the College were held from the first of March until October, giving the students an opportunity to teach school, of which privilege Dr. Wilson availed himself, teaching for the next few years in several different places.

In the winter of 1873 he went to Cambridge, Massachusetts, to continue his botanical studies, which had been begun in the State Agricultural College of Michigan. In 1874 he was appointed assistant to Professor Goodale, at Cambridge, at the suggestion of Dr. Asa Gray, with whom Dr. Wilson had studied the summer following his resignation from active teaching at Harvard University. In the spring and summer of 1874 he worked constantly in a private laboratory under the direction of Dr. Asa Gray, who, during the years from 1873 to 1878, gave the young botanist some of the most valuable lessons and suggestions which came from any source whatsoever.

Dr. Wilson remained at Cambridge until the close of the college year of 1878, occupying the position of assistant under Professor Goodale, at the same time doing a great deal of teaching and tutoring outside. During the time that he was at Cambridge he took various studies in the University, at the Agassiz Museum in Zoology. During two years of this time studies were carried on in chemistry, in physics, and in modern languages, so that in 1878, when he left, the degree of Bachelor of Science was granted him from the Lawrence Scientific School.

In the summer of 1878 the subject of this sketch visited England, France, and in the fall, Germany, where he matriculated at the University of Göttingen. He remained at Göttingen until the spring of 1879, when he went to Naples and matriculated at the University there,



WILLIAM P. WILSON.

UNIVERSITY OF ARIZONA

attending the lectures in mineralogy and botany of Professor Chisati, a celebrated systematic botanist of that day. Returning in the summer to the University of Berlin, Dr. Wilson matriculated there for one semester. In Germany he attended the lectures of Grisebach, the greatest geographical botanist of the world at that time, also those of Professors O. Drude and Reinke. In Berlin he placed himself under Schwendener, working in his laboratory on some of Wiesner's experiments on light, securing his apparatus from Professor Helmholtz's laboratory. During the vacation periods Dr. Wilson visited Sachs, at Wurtemburg; Nägeli, at Munich, and in the winter of 1879 and 1880 matriculated in the University of Tübingen, under Dr. William Pfeffer, pursuing work under his direction along physiological lines. In July of 1880 he took the degree of Doctor of Science at Tübingen, with honors. In the winter of 1880 he came home to America, remaining one month, when he returned to Tübingen, upon the invitation of Dr. Pfeffer, to carry on some special lines of work there. Returning to America in 1882, many flattering offers were tendered to him from the West and Southwest.

Mrs. Wilson, being in delicate health, Dr. Wilson spent part of the intervening time with her in the South during the winter months. Several years after the death of Mrs. Wilson, he married Miss Lucy Langdon Williams, Head of the Department of Natural History, Girls' Normal School of Philadelphia. In the middle of the winter of 1886 Dr. Wilson was appointed Professor of the Anatomy and Physiology of Plants at the University of Pennsylvania.

Professor Wilson, during his vacations, spent considerable time in Florida, where he was enabled to study the

peculiar sub-tropical flora of that State. His studies upon the bald cypress of the Florida swamps are especially noteworthy, as combining both morphological and physiological research. He clearly demonstrated, both by experiments in the greenhouse, and by a microscopic study of the peculiar knees produced on this tree and on other plants living or grown under similar conditions, that the protuberances on the roots are breathing organs, and are produced in direct response to the action of the environment.

His original work—teaching and direction of the biological school at the University, to which he was appointed on the death of the venerable scientist, Dr. Joseph Leidy—occupied fully his time until 1893, when Professor Wilson made the proposition to one or two public-spirited gentlemen on September 7, 1893, to procure from the foreign exhibitors at the World's Columbian Exhibition the fine collections which had been so carefully gathered together for exhibition purposes. Later, City Councils took hold of the matter, and with an appropriation of $10,000, Dr. Wilson, resigning the Directorship of the Biological School, went to Chicago and succeeded in securing a vast collection of various objects from Mexico, Costa Rica, Guatemala, British Guiana, Ecuador, and various South American, European and Asiatic States. Dr. Wilson succeeded in organizing a vast museum of economic products during the two years' leave of absence granted to him by the University—a museum occupying the former offices of the Pennsylvania Railroad Company, with a floor space of some 200,000 square feet. As Director of this Museum, Dr. Wilson's time is very fully occupied with the executive work of the institution, so much so that he resigned his professorship in the University of Pennsylvania.

As a teacher, Dr. Wilson always reinforced his lectures by laboratory exercises, conspicuous for the wealth of illustration. His methods were modern and his lectures clear and forcible. As a lecturer Dr. Wilson had a pleasant style of address, which at once won the attention of his hearers. As an investigator, Dr. Wilson's methods were exhaustive and painstaking. He never considered a piece of work finished until he had thoroughly worked over the whole subject and the literature.

Dr. Wilson is a member of the Academy of Natural Sciences of Philadelphia; of the American Philosophical Society; of the Pennsylvania Historical Society; of the Pennsylvania Forestry Association; of the American Association for the Advancement of Sciences, and other scientific bodies.

Bibliography.

1. "Über intramolekulare Athmung," 1881-1882. Researches carried on in Pfeffer's Laboratory.

2. "On the Cause of the Excretion of Water on the Surface of Nectaries." (Dissertation for Degree) 1881.

3. "Respiration in Plants."—*American Journal of Science*, 3rd series, XXIII: 423.

4. "The Production of Aerating Organs on the Roots of Swamp and other Plants."—*Proceedings Academy of Natural Sciences*, 1889: 67.

5. "The Influence of External Conditions on Plant Life."—*Biological Lectures*, Wood's Holl, 1893: 163.

6. "Summer Schools in Botany."—*University Extension*, 1891: 108.

7. "Report of the Board of Trustees for Establishing City Museums, 1894.

8. "Observations on Epigæa repens, L."—*Contributions to Botanical Laboratory of the University of Pennsylvania*, I: 56. Plate.

9. "Preliminary Observations on the Movements of the Leaves of Melilotus alba L. and other Plants." Assisted by J. M. Greenman—*Contributions of Botanical Laboratory of the University of Pennsylvania*, I: 66. With plates.

10. "The Bald Cypress."—*Forest Leaves*, II : 110. Plate.

11. "The Palmetto of the Southern States."—*Forest Leaves*, III : 53. Plate.

12. "Dwarf Trees."—*Forest Leaves*, III : 70.

13. Review. "Leitfaden der Botanischen Mikroskopie. W. Behrens. *Torrey Bulletin*, XVIII : 88.

14. Review. "Ueber Schutzmittel des Laubes gegen Transpiration besonders in der Flora Javas." A. F. W. Schimper.—*Torrey Bulletin*, XVIII : 217.

15. Review. "Introduction to Botany." Volney M. Spaulding.—*Science*, N. S., I : 496.

16. "On the Relations of Sarracenia purpurea to Sarracenia variolaris. —*Proceedings Academy of Natural Sciences*, 1888 : 10.

17. "Remarks on Death of Professor Asa Gray."—*Proceedings Academy of Natural Sciences*, 1888 : 67.

18. "On the Use of Bambusa Stem in Incandescent Electric Lighting." *Proceedings Academy of Natural Sciences*, 1889 : 129.

C. D. FRETZ.

C. D. Fretz, M. D., was born in Bucks County, Pennsylvania, November 16, 1844. He acquired all that was to be obtained in the public schools of the county; attended several terms at an academy at North Wales, Pennsylvania, and prepared himself for the profession of a teacher. He taught school for a number of years, during which time he acquired a taste for the study of botany, which he pursued with ardor, and which has afforded him the only recreation during a long and successful career in the medical profession. While engaged in reading medicine with his preceptor, Dr. J. S. Moyer, now of Quakertown, Pennsylvania, who was then preparing a catalogue of the Bucks County plants, he became deeply interested in the work, and assisted him in exploring the

upper and middle districts, and making extensive collections for a future herbarium. The catalogue was published in 1876, and is the only one extant of its rich and varied flora.

In March, of 1868, he graduated from the Medical Department of the University of Pennsylvania, and immediately located at Sellersville, Pennsylvania, where he still resides. Here he continued to devote much of his leisure time to the exploration of the nearby trap-rock region and the adjoining swamps, and also to making frequent excursions into other parts of the county, notably the lower end, in the vicinity of Bristol. This latter region was found especially interesting from the similarity of its flora to that of the swamps and barrens of South Jersey, and furnished many new and rare plants. From collections made in different parts of Pennsylvania, New Jersey and New York, together with exchanges and purchases, he gradually acquired the greater portion of the plants of the eastern and southern United States, a total of about 5000 species and varieties.

Since the publication of the Bucks County Catalogue, he has added about fifty new plants, the rarest of which are: *Carex grisea* Wahl *var. rigida*, Bailey—new to science and probably a good species—*Ranunculus abortivus* L. *var. micranthus*, Gray—new to the State Flora; *Isoetes Engelmanni* Braun, *Lemna trisulca* L., *Callitriche deflexa* Braun, *var. Austini* Hegelm, *Sium Carsonii* Durand, *Valerianella Woodsiana* Walf, *var. patellaria*, Gray, *Pentstemon lævigatus* Solander, *Crepis tectorum* L., *Coreopsis discoidea*, Torr and Gray, *Bromus Kalmii*, Gray, *Plantago Patagonica* Jacq, *var. aristata*, Gray, *Solanum rostratum* Dunal, *Carex torta* Boott,

Eragrostis Purshii Schrader, etc. With his knowledge of Bucks County plants, Dr. Fretz has underway a complete revision of the "Catalogue," which will shortly be republished.

He is a member of the Philadelphia Botanical Club, the Pennsylvania Forestry Association and other societies.

GEORGE REX.

Dr. George Rex * was born at Chestnut Hill, and at the time of his death was in his fiftieth year. He was a graduate of the University of Pennsylvania, and during his earlier life was Assistant Demonstrator of Anatomy in that institution. He was a member of the College of Physicians and Surgeons, and other medical societies.

Dr. Rex † became a member of the Academy of Natural Sciences in January, 1881, and in December, 1881, he was elected a member of the Microscopical Section. He served as its Conservator from November 3, 1890, until his death.

Dr. Rex was the highest authority on the *Myxomycetes* in the United States. It was his enthusiastic study of this group that first brought him to the Academy, aud his communications on this subject formed an interesting part of nearly every meeting. He was the author of a number of species, which, owing to his extreme conservatism, will doubtless, continue to bear his name. Many forms, new to him, remained in his collection unnamed for years, and were only published when he had thoroughly convinced himself that they were really new to science. His

* See *Ledger*, February 5, 1895, for obituary notice. A framed photograph of Dr. Rex hangs in the herbarium room, Academy of Natural Sciences.

† 1895. *Proceedings of Academy of Natural Sciences*, 40.

collection of *Myxomycetes*, presented by his sister, reposes within the Academy of Natural Sciences of Philadelphia. Although he was interested principally in the *Myxomycetes*, he was an earnest student of the lower orders of fungi, and an ardent admirer of everything beautiful in microscopic nature.

Dr. Rex was a faithful and tireless worker, and those who came in contact with him as fellow-student and colleague, could not fail to appreciate his genial disposition and his faithfulness in friendship.

As a professional man his work brought him into all grades of life, and it is especially among the poor and needy that may be found to-day a sincere and heartfelt grief, which constitutes his only reward for many hours of toil. He had been a practitioner in Philadelphia about twenty-five years, and was highly esteemed within the profession. During the Civil War he was an engineer in the United States Navy.

One sister and four brothers—Miss L. M. Rex, the Rev. Henry L. Rex, ex-Register of Wills; Walter E. Rex and Alfred C. Rex, all of Philadelphia, and Dr. T. A. Rex, of Pittsburg, survive him. He died suddenly on the morning of February 4, 1895, of heart trouble.

Bibliography.

1. "Siphoptychium Casparyi."—*Botanical Gazette*, IX–X : 176.

2. "The Myxomycetes, their Collection and Preservation."—*Botanical Gazette*, IX–X : 290.

3. "Review. Die Pilzthiere oder Schleimpilze, nach dem neuesten Standpunkte bearbeitet. Dr. W. Zopf.

4. "Notes on the Development of Tubulina cylindrica and Allied Species of Myxomycetes."—*Botanical Gazette*, XV : 315.

5. "On the Genus Lindbladia."—*Botanical Gazette*, XVI : 201.

6. "New American Myxomycetes."—*Proceedings Academy of Natural Sciences*, 1891 : 335, 389.

7. "Hemiarcyria clavata, Pers."—*Proceedings Academy of Natural Sciences*, 1891 : 407.

8. "New North American Myxomycetes.—*Proceedings Academy of Natural Sciences*, 1893 : 280, 364.

9. "Diachœa Thomasii."—*Proceedings Academy of Natural Sciences*, 1894 : 289.

10. "Notes on Cribraria minutissima and Licea minima."—*Botanical Gazette*, XIX : 397.

11. "The Banded-spore Trichias."—*Journal of Mycology*, II : 85.

CLEMENT BELTON LOWE.

Clement Belton Lowe was born in Salem, New Jersey, in 1846. After a term of study in the schools of Salem, the young man entered Bucknell College at Lewisburg, graduating in 1865 with the degree of Bachelor of Philosophy. Intending to become a civil engineer, Mr. Lowe then entered the Philadelphia Polytechnic College, but, because of ill-health, was compelled to relinquish the course. In the following year, 1867, he purchased the drug store at Ninth and Vine Streets, in connection with William Lippincott. Some years later he purchased his partner's interest, continuing the business under the firm name of C. B. Lowe & Company, until about two years ago.

In 1882 he entered the Philadelphia College of Pharmacy, graduating in 1884. He was made in 1885 a quiz-master to the alumni association quiz, and in 1887 was appointed assistant to Professor Maisch and quiz-master to the college review quizes, occupying this position until the death of Professor Maisch. On the election of Professor Bastin he was appointed his assistant, and afterwards elected Instructor of Materia Medica and Botany. With a view to increasing his usefulness as a teacher, he attended lectures

at the Jefferson Medical College, graduating in 1887. He was a member of the Executive Board of the Alumni Association of the Philadelphia College of Pharmacy for over ten years, President of the Association for the college year 1888–89, was Chairman of the Committee on Social Meetings for five years, and Treasurer of the Bucknell Alumni Society of this city. On the death of Professor Bastin, Mr. Lowe was elected Professor of Materia Medica in the Philadelphia College of Pharmacy.

He is a member of the American and of the Pennsylvania Pharmaceutical Associations, and is Chairman of the State Association's Committee on Adulterations. Among his literary work should be mentioned a book entitled, "Syllabus of the Botanical Natural Orders," two editions of which have been published by and sold for the benefit of the Alumni Association of the Philadelphia College of Pharmacy.*

HUGO BILGRAM.

Hugo Bilgram was born in Memningen, Bavaria, in 1847, and graduated as a mechanical engineer at Augsburg. He immigrated to this country in 1869, being employed by the then celebrated optician, Joseph Zentmayer, between 1870–1874, where he familiarized himself with the construction and use of the microscope. Through Mr. Wm. C. Stevenson, Jr., he became interested, as an amateur, in mycology, especially the Myxomycetes. His work in this line, however, has been confined to making a private collection, and supplying Mr. J. B. Ellis, of Newfield, New Jersey, with a number of species for his exsiccata of American Fungi. His collection of slime moulds, neatly arranged in boxes, is not surpassed by any other collection in the city.

* Philadelphia *Ledger*, May 5, 1897, with cut.

WILLIAM CLARK STEVENSON.

William Clark Stevenson, Jr., was born December 7, 1848, at Philadelphia. He attended the public schools, Rugby Academy and Polytechnic College of Pennsylvania. From 1870 to 1880, Mr. Stevenson was in the wholesale drug business, and in the paper box trade (Novelty Paper Box Company) from 1881 to 1894.

Mr. Stevenson is more especially interested in mycology, and has a mycological herbarium of some 5500 species, mostly of his own collecting, from Philadelphia, Chester and Delaware Counties, Pennsylvania.

A paper entitled "Additions to Mr. Cooke's Paper on the Valsei of the United States" appeared in the *Proceedings of the Academy of Natural Sciences*, April, 1878, pp. 86–88, and was the result of an examination of the Schweinitzian types in the Academy herbarium. He has been a life-long friend of Mr. J. B. Ellis. He has prepared a manuscript card catalogue of references, mostly American, bearing upon mycology. His habitat list, and list of plant diseases due to fungi, is very complete and full, and deserves publication by some learned society. The host plants are very carefully catalogued, as also the parasites which prey upon them.

Mr. Stevenson is a member of the Academy of Natural Sciences, the Photographic Society of Philadelphia and Société Belge de Microscopie, of Brussels, Belgium.

ROBERT G. BECHDOLT.

Robert G. Bechdolt, son of William L. and Lizetta Bechdolt, was born December 26, 1848, at Knealingen, Baden, Germany, and four years afterwards came, with the rest of the family, to the United States, locating at Easton, Northampton County, Pennsylvania, where he attended the

public schools until the age of ten, when he was taken down with a severe attack of scarlet fever, leaving him an invalid for many years thereafter. Upon the advice of his physician, he was directed to follow out-door occupations. He devoted his time as it seemed to agree with him best, roaming the hills and valleys in search of natural history specimens such as birds, plants and animals, which he collected without the knowledge of method of determining their species.

In due time his father engaged him to a nurseryman, Mr. Charles Davis, of Warren County, New Jersey, a friend of the family, who took a great interest in him, and often in his absence entrusted his property to his care, and when Mr. Davis disposed of his nursery, Mr. Bechdoldt engaged himself in a minor position at Lafayette College, Easton, Pennsylvania, where in due time he made the acquaintance of Dr. Green, Dean of the Pardee Scientific School, through whose kindness he was given entrance to all the scientific departments of the college. In 1865 he was quite successful in finding a number of rare plants, as well as being the first to notice the coral fossils in the glacial drift of college hill. Through the influence of Dr. Thomas C. Porter and his assistant, the late Dr. A. P. Garber, he was guided in his botanical researches, in which he was quite successful in the finding of rare and new species of plants.

His parents having purchased a small farm in Seidersville, a village about three miles south of South Bethlehem, Pennsylvania, he moved there with them in 1871. In 1872 he was elected a member of the South Bethlehem Natural History Association, and during his membership the following papers were brought before the society:

(1) "Accumulation of Plant Life at the Equator, Causes, etc." (2) "The Lower Forms of Animal Vision traceable to that of Plant Life." (3) "Migration of Plants."

On April 15, 1873, Mr. Bechdolt was elected a member of the Chemical and Natural History Society of Lehigh University, at South Bethlehem, Pennsylvania, and was made Curator, November 3, 1873. In August, 1874, he was sent by the latter society on a collecting trip to Key West, Florida, and to the southern portion of the State of Texas, returning in the year 1875, when he was again requested to make a trip to explore the Amazon region in Brazil, South America. The specimens collected on this trip consisted mostly of plants and zoological specimens and Indian utensils of the tribe Tapnios. From one of the medicine men of the latter tribe he secured the skeleton of the rare bird *Palamedea carnuta* and the silicious sponge from the bottom of the mouth of the Tapajos River.

At present Mr. Bechdolt is farming in the vicinity of Seidersville.

LEWIS PALMER.

Lewis Palmer, father of T. Chalkley Palmer, President of the Delaware County Institute of Science, was a good botanist, especially familiar with the oaks.

EDMUND Y. McCALLA.

Edmund Y. McCalla was a close student of botany, his books and his rambles in the field constituting his chief enjoyment during the greater part of his life. His interest and his energies were devoted particularly to Fairmount Park; he knew every foot of its three thousand acres, and

his love for the trees and wild flowers amounted almost to a passion. His pleasure was never selfish, and years of hard labor were devoted by him to the propagation of rare species of plants in different parts of the Park. He loved the work for its own sake, his reward being the success of his efforts. He was often misunderstood, his work thwarted and undone, but he laughed merrily over his difficulties, and, with apparently unlimited patience and good nature, did the work over again. Plants that were rare in the Park, he introduced, bringing seeds, roots or young plants from other localities. He brought plants from the seaside; he introduced *Coreopsis senifolia* which comes from the South, and he planted in several places the winter aconite, *Eranthis hyemalis*.

But his greatest work was in the planting of trees. One fall he gathered at Bartram's Garden 300 acorns of the mossy-cup oak (*Quercus macrocarpa*), which he distributed all over the Park. Young trees were culled out from places where they could not thrive and were transplanted to favorable sites, and the growing trees were tenderly watched and cared for as though they were in a private garden. During the last six years of his life Mr. McCalla devoted his energies almost exclusively to the top of "Tunnel Rock" in the East Park. His first work was the planting of trees, but his plan expanded as he saw the success of his labors; flower beds were laid out and cultivated, noxious weeds were rooted out, so that gradually the place assumed the aspect of a garden, from having been the most barren spot in the Park. The labor involved was enormous, for soil and water, as well as fertilizer, had to be carried to the top of the hill, and Mr. McCalla had no

assistance. He was killed while walking across the Pennsylvania Railroad track at this point, by being struck by a train, on July 11, 1889.

Mr. McCalla's personal infirmity, his extreme deafness, naturally limited the circle of his intimates, but to those who were fortunate enough to know him well, he was recognized as a brave, pure-minded, upright, unselfish man; an earnest and untiring student and devoted friend.

J. M. ANDERS.

Dr. J. M. Anders, a prominent physician of the city, can hardly be classed among the botanists of Philadelphia. He, however, deserves notice in this book as the author of two papers dealing with subjects on the medical side of botany. The first paper, entitled, "On the Transpiration of Plants," published in the *American Naturalist*, March, 1878, 160, was the result of study and experimentation on the plants grown in Horticultural Hall, Fairmount Park. His other paper, "Sanitary Influence of Forest Growth," was published in the *Proceedings of the Philadelphia County Medical Society*, January 29, 1885. A book appeared in 1887 on the same subject.*

CHARLES HENRY KAIN.

Charles Henry Kain was born in New Jersey, and received his education in the schools of that State, including the Trenton Classical Academy and the New Jersey State Normal School, which he left before graduating, in order to pursue classical studies with a view of entering college.

* *House Plants as Sanitary Agents; or, the Relation of Growing Vegetation to Health and Disease, comprising also a Consideration of the Subject of Practical Floriculture and of the Sanitary Influences of Forests and Plantations.* By J. M. Anders, M. D., Ph. D. J. B. Lippincott, 1887.

This plan was frustrated by the breaking down of his health. He became principal of the North Ward Grammar School in Camden, in 1868, succeeding in that position William L. Sayre, now principal of the Central Manual Training School. When Mr. Sayre left the Stevens School in Camden, Mr. Kain took his place there. In 1874 Mr. Kain began his work in Philadelphia as Principal of the Northwest Boys' Grammar School at Fifteenth and Race Streets, and continued his work there until the close of 1886, when he accepted the position of Assistant Superintendent of Schools, to which he was appointed by Dr. MacAllister in November of that year.

Mr. Kain is an expert photographer and uses the stereopticon skillfully. The development of the present illustrative movement in the schools is largely due to his efforts. He has been instrumental in extending the work in several states. He has devoted a great deal of time to scientific work, particularly to microscopy, and has worked up the diatoms of New Jersey for the state geological survey.

Mr. Kain received the degree of A. M. from Lewisburg, now Bucknell University, in 1868. He is President of the Teachers' Photographic Association and is a member of the Educational Club, the Teachers' Institute, the New York Academy of Sciences, the Torrey Botanical Club, a corresponding member of the New York Microscopical Society and an honorary member of the State Microscopical Society of Illinois.

His principal papers on the diatoms appeared in the *Bulletin Torrey Botanical Club.*

1. "Notes on Diatoms."—XIV : 25.

2. "New Fossil Deposits of Diatomaceæ."—XIV : 57.

3. "Diatoms, Raising them in the Laboratory" (*Review*).—XIV : 78.

4. "Diatom Slides."—XIV : 131.

5. "Notes on Diatoms."—XIV : 141.

6. "Movement of Diatoms" (*Review*).—XIV : 172.

7. "Diatomaceæ. Review Report of the Challenger Expedition." Part II.—XIV : 174.

8. "On a Fossil Diatomaceous Deposit from Oamaru, New Zealand." —XIV : 247.

9. "Diatoms of Atlantic City and Vicinity."—XV : 128.

10. "On a Fossil Marine Diatomaceous Deposit from Atlantic City, New Jersey."—XVI : 71, 207.

11. "Diatomées Fossiles du Japon" (*Review*).—XVII : 18.

12. "Recent Contributions to the Literature of the Diatomeæ."—XVIII : 156.

13. "Diatoms : Their Life History and their Classification" (*Review*).—XIX : 27.

14. "What is a Diatom."—XIX : 104.

15. "Francis Wolle."—XX : 211.

16. "De la Culture Artificielle des Diatomées" (*Review*).—XX : 259.

EUGENE A. RAU.

The following is a partial list of scientific papers and notices, by Eugene A. Rau, a botanist of Bethlehem, Pennsylvania.

1. "Catalogue of North American Musci." Eugene A. Rau and A. B. Hervey. Taunton, 1880.

2. "Additions to the Habitats of North American Sphagna."—*Botanical Gazette*, IX–X : 26.

3. "Fungi Hungarici."—*Botanical Gazette*, IX–X : 77.

4. "Helonias bullata in Northern New Jersey."—*Botanical Gazette*, IX–X : 113.

5. "Manual of the Mosses of North America, Lesquereux and James" (*Review*).—*Botanical Gazette*, IX–X : 151.

6. "A New Phallus."—*Botanical Gazette*, VII–VIII : 223.

ELIAS DIFFENBACH.

Elias Diffenbach was a compositor in the printing office of Collins & Company. His vocation injured his health and he was threatened with consumption. Dr. A. W. Chapman wrote from Apalachiola, Florida, that the law allowed him a deputy whose duties were nominal and whose salary would be $1200 a year. He wanted a botanist. Charles E. Smith, of Philadelphia, named Diffenbach, who at first accepted and afterwards declined. Mr. Smith urged him to accept, saying: "If you were a rich man you would spend a thousand dollars in going to Florida for your health. Here you are offered a $1000 if you will go." He finally declined, and Saurman went in his place. Diffenbach then went to Illinois, where he had a brother, a druggist, with whom he worked, the next year dying of consumption.

EMILY L. GREGORY.

Emily L. Gregory* was born at Portage, New York, December 31, 1841. Her early education was had at Albion Seminary, from which school she graduated, afterward teaching at Dunkirk (Fredonia) Friendship Seminary. In 1876 she entered Cornell University, where she studied botany and literature, taking her degree of Bachelor of Literature in 1881. She was a teacher of botany at Smith College from 1881 to 1883, and the following winter had charge of the laboratory work in botany, at the Harvard Annex. She went abroad in 1883 and 1884, and studied for two years at Strassburg, under Professor Wigand, and at

* 1897. *Torrey Botanical Bulletin*, XXIV: 221, with photograph. The main facts of this sketch are derived from this source.

Zurich for one year, where she received her degree of Doctor of Philosophy in 1886. When she returned to America she taught at Bryn Mawr College, as an associate to Professor E. B. Wilson, who was then Professor of Biology. She resigned because the position was not congenial to her, and during the following winter was associated with Professor W. P. Wilson, at the University of Pennsylvania.

She was appointed Instructor in Botany at Barnard College in the spring of 1889, and during the summer of that year she spent abroad studying with Professor Schwendener at Berlin, purchasing, as the opportunity afforded, microscopes, charts, models, and books for the new laboratory. The summer vacation of 1893, 1894 and 1895, were likewise spent abroad.

The botanical department at Barnard grew rapidly in popularity and in numbers, and it became necessary to obtain the assistance of Miss Effie Southworth, now Mrs. Volney M. Spalding, and later, of Miss Jane Howell. The laboratory collections consisted first of the herbarium of Elizabeth G. Knight, to which was later added that of Dr. Thomas Morong, purchased by funds raised by members of the Torrey Botanical Club. A fellowship in botany was endowed by one of the members, Mrs. Esther Herrmann.

The laboratory soon outgrew its quarters at 343 Madison Avenue, and was removed to a more commodious place, on the top floor of 518 Fifth Avenue. Dr. Gregory was appointed Professor of Botany in 1896, and Dr. Herbert M. Richards was called to assist her. Together they planned the new courses and laboratories in Brinckerhoff Hall, but Dr. Gregory did not live to see them completed, dying on

April 21, 1897. She was a member of the Torrey Botanical Club, the American Association for the Advancement of Science, and a contributor to the *Torrey Bulletin* and *Botanical Gazette.*

"Personally, Dr. Gregory was extremely attractive, not only for her cheery good temper, but for her faculty in making friends, and for her kindly and personal interest in all with whom she came in contact." Her original papers and reviews, as given in the bibliography in the *Torrey Botanical Bulletin*, number thirty-eight different titles; omitting the reviews, which number twenty-six titles, the names of her original contributions to botany are here given:

1. "The Pores of the Libriform Tissue."—*Bulletin Torrey Botanical Club*, XIII: 197-204 (1886).

2. "Death of Dr. Wigand."—*Botanical Gazette*, XII: 16 (1887).

3. "Systematic Botany."—*Botanical Gazette*, XII: 298 (1887).

4. "Notes on some Botanical Reading done in the Laboratory of Professor Schwendener, in Berlin, June and July, 1889."—*Bulletin Torrey Botanical Club*, XVI: 297-304 (1889).

5. "Notes on the Manner of Growth of the Cell Wall."—*Bulletin Torrey Botanical Club*, XVII: 247-255 (1890).

6. "Abnormal Growth of Spirogyra Cells."—*Bulletin Torrey Botanical Club*, XIX: 75-79 (1892).

7. "Anatomy as a Special Department of Botany." Read before A. A. A. S., Rochester, 1892.—*Bulletin Torrey Botanical Club*, XX: 100-107 (1893).

8. "Elements of Plant Anatomy." Ginn & Co., Boston, 1895, octavo pp. v, 148.

9. "What is meant by Stem and Leaf."—*Bulletin Torrey Botanical Club*, XXIII: 278-281 (1896).

10. "Development of Cork Wings on Certain Trees."—*Botanical Gazette*, XIII: 249, 281, 312; XIV: 5, 37.

JOHN W. ECKFELDT.

John W. Eckfeldt, M. D., was born in Philadelphia January 29, 1851. His grandfather was Adam Eckfeldt, first coiner of the United States Mint. His father, Jacob R. Eckfeldt, occupied the position of Assayer of the Mint at Philadelphia from 1832 to 1872. His mother was Emily Levering, daughter of Mark Levering. Dr. Eckfeldt received a public school education, later entering the Friends' Central School at Fifteenth and Race Streets, and afterwards completing his course of study at the Lauderback Academy, entering the University of Pennsylvania in September, 1869, and graduating in medicine March 12, 1872. Soon after graduating in medicine he began the practice of his profession at Haverford, Delaware County, remaining there until the fall of 1880, when he removed to Philadelphia, where he soon gained an extensive business. Dr. Eckfeldt early acquired the love for natural history, devoting much of his leisure time to the studies of entomology and botany, when desiring to concentrate his efforts upon the latter science he abandoned the former. His principal aim soon became manifest, for he prepared a large and valuable herbarium, which became greatly enriched by the aid of numerous correspondents. His attention was then drawn to the cryptogams, and his whole devotion was given to the then unexplored branch of lichenology, which, at the time of the death of Dr. Tuckerman, was a new field for extensive study and research.

Dr. Eckfeldt's literary work consists of some short papers and synopses of species. Among some of these may be mentioned, "A descriptive Enumeration of some rare North American Lichens," "Description of some new North

JOHN W. ECKFELDT.

UNIVERSITY OF ARIZONA

American Lichens," "A further Enumeration and Description of some Lichens of the United States," "An Enumeration of the Lichens of Newfoundland and Labrador, with Description of new and rare Species," "On Alectoria Cetrariza Nyl., a new species from Oregon,"* "Determination of the less conspicuous and more difficult Species of Lichens from Ohio," "Revision and Determination of the Lichens of Lancaster County, Pennsylvania," "Determination of the Lichens for the Academy of Natural Sciences, in the Contribution to the Flora of Greenland," "Notes on the Lichens in the Herbarium of the Academy of Natural Sciences," "Revision of the Lichens in the Schweinitz Herbarium," "The Lichen Flora of Florida," "Revision of the Lichens in the Geographical Survey of New Jersey," "Chemical and Medicinal Properties of Lichens," "List of the Lichens from California and Mexico, collected by Edward Palmer," "Determination of the Lichens from Southern Patagonia, collected by the U. S. S. Albatross, 1887 to 1891," "List of the Lichens from the Desert of Atakamia, collected by Thomas Morong," "List of the Lichens collected in Bolivia, by H. H. Rusby, M. D." In preparation, "An Enumeration of the Lichens of British America, United States and Mexico."

Dr. Eckfeldt in April, 1898, presented to the Academy of Natural Sciences his valuable collection of lichens, which he spent a quarter of a century in collecting. It is one of the most complete in this country, only one other, that of the late Professor Tuckermann, of Amherst College, approaching it. The collection contains upwards of 4000 specimens, including 2800 different species. His collection

* *Bulletin Torrey Botanical Club*, XVIII: 257.

of ferns, amounting in all to some 300 species, he presented to the Botanical School of the University of Pennsylvania.

Dr. Eckfeldt is a member of the Academy of Natural Sciences of Philadelphia; of the Philadelphia and Delaware County Medical Societies; West Philadelphia Medical Club; the Torrey Botanical Club, of New York; the Philadelphia Botanical Club; a life-member of the Medico-Chirurgical Hospital; Alumni Society of the University of Pennsylvania and Medico-Chirurgical College.

FRANK LAMSON-SCRIBNER.

Professor Frank Lamson-Scribner* was born in Massachusetts, in 1851. His family name was Lamson, but having early lost his parents, he was adopted into a family of the name of Scribner, living near Augusta, Maine; and there he was brought up. From his youth, Professor Scribner showed his natural bent for botanical pursuits. At the age of eighteen, while still on the farm, he prepared a treatise on the "Weeds of Maine," an illustrated pamphlet of sixty-two pages, prepared for the State Board of Agriculture, and his first botanical collections, made in 1866 to 1867, were acquired by Bowdoin College.

In 1870 he entered the State College of Agriculture and the Mechanic Arts at Orono, from which institution he graduated in 1873, with the degree of B.S. He lived in Philadelphia from January, 1877, until May, 1885, during which time he was an officer in Girard College. During his eight years' residence in Philadelphia, he collected extensively and wrote some papers on grasses while there. As a

* A portrait of Professor Scribner appeared in *The Graphic*, November 19, 1892. Article entitled, "The University of Tennessee."

member of the Academy of Natural Sciences and as Recording Secretary of the Botanical Section, he had excellent opportunities to pursue his favorite science. His botanical associates, Dr. J. B. Brinton, Mr. Redfield, Mr. Isaac Burke, Mr. Martindale, were all botanists of more than local repute. Dr. Rothrock, of the University, and Mr. Charles E. Smith, were also well acquainted with Professor Scribner.

In May, 1885, Professor Scribner was appointed Assistant Botanist in the Department of Agriculture, and later became Chief of the Section of Vegetable Pathology. Afterwards, he accepted the Directorship of the Tennessee Agricultural Experiment Station, and held the position also of botanist in the same institution, until he was again called to Washington to become the head of the Department of Agrostology, Department of Agriculture, founded through the determination of Secretary Morton to secure the services of a capable agrostologist, whose entire time should be devoted to the subject of grasses. His recommendation by such men as Professor Charles E. Bessey, Professor N. L. Britton, Professor W. G. Farlow, Dr. John M. Coulter and others, speaks of the scientific standing of Professor Scribner among his colleagues. Professor Scribner is a member of a number of scientific societies, and in 1889 he received from the French Government, for his services in matters pertaining to viticulture and diseases of the vine, the Chevalier's Cross of the Order of Mérite Agricole. He has written extensively upon botanical subjects, and has one of the largest private collections of grasses in the country (recently destroyed by fire), numbering nearly 5000 specimens.

Bibliography.

1. "Weeds of Maine."—*Report Maine State Board of Agriculture*, 1869, pp. 62. Illustrated.

2. "Ornamental and Useful Plants of Maine," Part I.—*Report Maine State Board of Agriculture*, 1874, pp. 85. Illustrated.

3. "A List of Grasses Collected by Mr. C. G. Pringle in Arizona and California, during the Summer of 1881, with Descriptions of those Species not already described in American Publications."—*Bulletin Torrey Botanical Club*, IX: 74, 86, 103, 145; X: 29.

4. "New North American Grasses."—*Bulletin Torrey Botanical Club*, XI: 5.

5. "Observations on the Genus Cinna, with description of a New Species."—*Proceedings Academy of Natural Sciences*, Philadelphia, 1884, 289. Illustrated.

6. "A List of Grasses from Washington Territory."—*Bulletin Torrey Botanical Club*, X: 63, 77. Illustrated.

7. "Agricultural Grasses of Central Montana."—*Proceedings Society Promotion Agricultural Sciences*, 1883, 12 pp. Illustrated.

8. "Agricultural Grasses of Arizona."—*Proceedings Society Promotion Agricultural Sciences*, 1886, 5 pp.

9. "A Revision of the North American Melicæ."—*Proceedings Academy Natural Sciences*, Philadelphia, 1885, 40, 1 plate.

10. "A Contribution to the Flora of Kansas—Gramineæ."—*Proceedings Kansas Academy of Sciences*, 1885, 5 pp., 3 plates.

11. "Grasses of Yellowstone National Park," I.—*Botanical Gazette*, XI: 169.

12. "Notes on a Hybrid Grass."—*Botanical Gazette*, IX: 167, with figures.

13. "A New Eriochloa." Vasey & Scribner.—*Botanical Gazette*, IX: 185, 1 plate.

14. "Arizona Plants."—*Botanical Gazette*, IX: 186.

15. "Some Arctic Grasses," with plate.—*Botanical Gazette*, XI: 25.

16. "Notes on Andropogon."—*Botanical Gazette*, XIII: 294.

17. "List of North American Andropogonæ."—*Bulletin Torrey Botanical Club*, XVI: 233.

18. "New or Little Known Grasses," I. (Four species described and figured.)—*Bulletin Torrey Botanical Club*, XV: 8.

19. "New or Little Known Grasses," II.—*Bulletin Torrey Botanical Club*, XVII : 225, 4 plates.

20. "The Grasses of Roane Mountain."—*Botanical Gazette*, XIV : 253. Illustrated.

21. "Mexican Grasses."—*Proceedings Academy of Natural Sciences*, Philadelphia, 1891, 292, 1 plate.

22. "Grasses of Mountain Meadow and Deer Parks."—*Proceedings Society for Promotion of Agricultural Sciences*, 1889. (Reprinted with illustrations in *Bulletin Tenn. Agr. Expr. Station*).

23. "Index to Grass Names."—*Proceedings Society for Promotion of Agricultural Sciences*, pp. 18, 1890.

24. "The Grasses of Tennessee." Part I.—*Bulletin Tenn. Agr. Expr. Station*, V, No. 2, pp. 89. Part II : 141 pp., 42 plates. 1894.

25. "Mount Kataadn and its Flora."—*Botanical Gazette*, XVII : 46.

26. "Weeds of the Farm."—*Bulletin Tenn. Agr. Expr. Station*, I, No. 3.

27. "The True Grasses." By E. Hackel. Translated from *Die Natürlichen Pflanzenfamilien*. By F. Lamson-Scribner and Effiie A. Southworth. 8 vo., pp. 227. Henry Holt & Co., 1890.

28. "Fungous Diseases of the Grape and other Plants and their Treatment." 12 mo., pp. 136. Illustrated. J. T. Lovett & Co.

29. "Report on the Fungous Diseases of the Grape Vine."—*Bulletin No. 2 Botanical Division U. S. Dept. Agriculture*. 1886, pp. 136, plates 7.

30. "Black Rot. Physalospora Bidwellii."—*Proceedings 7th Annual Meeting Society for Promotion of Agricultural Sciences*, 1886, pp. 7.

31. "Botanical Characters of Black Rot. Physalospora Bidwelli Sacc."—*Botanical Gazette*, XI : 297, plate 1.

32. "New Observations on the Fungus of Black Rot of Grapes."—*Proceedings 9th Annual Meeting of Society for Promotion of Agricultural Sciences*, 1888.

33. "Successful Treatment of Black Rot."—*Idem*.

34. "Report on the Extent, Severity and Treatment of Black Rot and Brown Rot in Northern Ohio, in 1889."—*Bulletin No. 11 Botanical Division of U. S. Department of Agriculture*, 1890, 7 pp.

35. "Black Rot." Scribner & Viala. *Bulletin No. 7 of Botanical Division of U. S. Department of Agriculture*, 1888, pp. 29, plate 1.

36. "Report on the Experiments made in 1887 in the Treatment of the Downy Mildew and Black Rot of the Grape Vine."—*Bulletin No. 5 of*

the Botanical Division of U. S. Department of Agriculture, 1888, pp. 110. Illustrated.

37. "Report on Experiments made in 1888 in the Treatment of the Downy Mildew and Black Rot of the Grape Vine."—*Bulletin No. 10 of Botanical Division of U. S. Department of Agriculture*, 1889, 6 pp.

38. "On a New Fungous Disease of the Vine. Greeneria fuliginea." Scribner & Viala.—*Proceedings 8th Annual Meeting of Society for Promotion of Agricultural Sciences*, 1888.

39. "Fungicides." Circular No. 5 of the "Section of Vegetable Pathology."—*U. S. Department of Agriculture*, 1887.

40. "Notes on Orange Leaf-Scab."—*Bulletin Torrey Botanical Club*, XIII : 181.

41. "Fungous Diseases of the Vine and their Remedies."—*Proceedings of the New Jersey State Horticultural Society*, 1886.

42. "Observations the Past Season on Grape Rot and Mildew."—*Proceedings New Jersey State Horticultural Society*, 1887.

43. "Fungous Diseases of Plants."—*An Address delivered before the East Tennessee Farmers' Convention at the 16th Annual Meeting*, 1891.

1885.—"Report as Assistant Botanist on the Fungous Diseases of Plants," 10 pp. *Annual Report U. S. Department of Agriculture.*

1886.—"Report as Special Agent in charge of the Mycological Section," 31 pp., 8 plates, 3 maps. *Annual Report U. S. Department of Agriculture.*

1887.—"Report as Chief of the Section of Vegetable Pathology," 74 pp., 17 plates. *Annual Report U. S. Department of Agriculture.*

"Fungous Diseases of the Grape and other Plants" (with numerous figures), 12 mo., 134 pp. J. T. Lovett & Co., Little Silver, New Jersey, 1890 (issued in 1891).

1895.—"Grasses as Sand and Soil Binders," 16 pp. Illustrated. Reprint from *Year Book of U. S. Department of Agriculture*, 1895.

Under Professor Scribner's supervision, as Chief of the Division of Agrostology, U. S. Department of Agriculture, have been issued eighteen bulletins descriptive of grasses. Bulletin 3, "Useful and Ornamental Grasses"; Bulletin 14, "Economic Grasses" and Bulletins 7 and 17, "American Grasses," (Illustrated) are especially note-worthy as from Professor Scribner's pen.

In addition to the above enumerated papers, contributions to horticultural and agricultural papers may be noted, especially to *Colman's Rural World, Maine Farmer, Home Farm,* and *Orchard and Garden.* In the last named paper a series of illustrated articles on the fungous diseases of plants appeared.

HAROLD WINGATE.

Harold Wingate was born in 1852, and was educated at the Philadelphia Central High School. He became interested in mycology, particularly in the *Myxomycetes,* and during the relaxation from his duties in connection with the International Navigation Company, has done much collecting of the *Mycetozoa.* He is the author of various papers on new genera and species of these interesting plants, and has a collection containing the local flora and types from many European authors.

Bibliography.

1. "A New Genus of Myxomycetes."—*Journal of Mycology,* II : 125.

2. "Tilmadoche compacta, n. sp."—*Proceedings Academy of Natural Sciences,* 1889 : 48.

3. "Notes on Enteridium Rozeanum."—*Proceedings Academy of Natural Sciences,* 1889 : 156.

4. "The Spores of the Myxomycetes."—*Proceedings Academy of Natural Sciences,* 1889 : 188.

5. "Note on Orthotricha."—*Proceedings Academy of Natural Sciences,* 1889 : 189.

6. "Orcadella operculata Wing, a New Myxomycete."—*Proceedings Academy of Natural Sciences,* 1889 : 280.

HENRY TRIMBLE.

Henry Trimble, the son of Stephen M. Trimble, was born May 22, 1853, at Chester, Pennsylvania. In his youth he attended regularly the Westtown Boarding School in

Chester County, Pennsylvania, receiving a very thorough general education from that well-known school. He was apprenticed in the drug business in 1872, and supplemented this equipment by the regular course of study in the Philadelphia College of Pharmacy, from which he received his diploma in 1876. Later, he passed two years at the University of Pennsylvania, pursuing special studies in organic and analytical chemistry. On May 28, 1878, he formed a business partnership with C. W. Warrington, with whom for five years he conducted a retail drug business at the corner of Fifth and Callowhill Streets, Philadelphia. In 1879 he was made asssistant to Professor Sadtler, at the Philadelphia College of Pharmacy, and four years later was appointed Professor of Analytical Chemistry in the college. In this connection he served, and during all the time he had charge of the analytical laboratory, directing many original investigations with students, the results of which have been published in the *American Journal of Pharmacy*, partly under the joint names of himself and student, and occasionally in the name of the student alone. His own investigations were directed largely to the study of the tannins, with which investigation his name will certainly be linked indissolubly in scientific literature. These investigations he collected together in a most valuable and comprehensive monograph, "The Tannins," * of which Volume I was issued in 1892, and the second volume in 1894. This work was very favorably received both in this country and abroad. His "Hand-Book of Analytical Chemistry,"

* *The Tannins. A Monograph on the History, Preparation, Properties, Methods of Estimation, and Uses of the Vegetable Astringents.* By Henry Trimble, Ph.M. Philadelphia, J. B. Lippincott Company. I, 1892, octavo, pp. 168. II, 1894, pp. 172.

HENRY TRIMBLE.

UNIVERSITY OF ARIZONA

first published in 1885, went through four editions and has been used in a number of schools. It is now a part of the larger "Text-Book of Pharmaceutical Chemistry," which he prepared with Professor Sadtler, and which was issued in 1895.

Professor Trimble, on March 26th, 1894, was unanimously elected Editor of the *American Journal of Pharmacy*, to succeed Professor John M. Maisch, who for many years had so ably presided over the destinies of this valuable journal. Haverford College conferred on him the honorary degree of A. M., in 1895. He died in August, 1898, mourned alike by the College and scientific world as a conscientious worker and staunch friend.

Bibliography.

1. "A Robust Pin Oak."—*Garden and Forest*, VII : 498.

2. "On the Tanning Properties of the Bark of Three North American Trees."—*Garden and Forest*, VIII : 293.

3. "Oil of Birch."—*Garden and Forest*, VIII : 303.

4. "Salt and Sugar in Washingtonia filamentosa."—*Garden and Forest*, IX : 133.

5. "The Tannin Value of Some North American Trees."—*Garden and Forest*, IX : 162.

6. "The Tannins of the Palmettos."—*Garden and Forest*, IX : 182.

7. "Estimation of Quinia."—*American Journal of Pharmacy*, 1877: 536.

8. "Oils of Peppermint and Spearmint."—*American Journal of Pharmacy*, 1885 : 484.

9. "Analysis of Phlox Carolina."—*American Journal of Pharmacy*, 1886 : 479.

10. "Bitter Principles of Burdock Fruit."—*American Journal of Pharmacy*, 1888 : 79.

11. "Some Indian Food Plants, Shepherdia argentina."—*American Journal of Pharmacy*, 1888 : 593.

12. "Catechu and Gambier."—*American Journal of Pharmacy*, 1888 : 497.

13. "Canaigre."—*American Journal of Pharmacy*, 1889 : 395.

14. "Some Indian Plants Foods."—*American Journal of Pharmacy*, 1889 : 4, 556.

15. "Eupatorium purpureum."—*American Journal of Pharmacy*, 1890 : 73.

16. "California Soap Plant."—*American Journal of Pharmacy*, 1890 : 598.

17. "Peucedanum Canbyi."—*American Journal of Pharmacy*, 1890: 281.

18. "Some American Galls."—*American Journal of Pharmacy*, 1890: 563.

19. "Carum Gairdneri."—*American Journal of Pharmacy*, 1891 : 525.

20. "Purshia tridentata."—*American Journal of Pharmacy*, 1892 : 69.

21. "Proximate Principle from Phytolacca decandra."—*American Journal of Pharmacy*, 1893 : 273.

22. "Four Oak Galls from India."—*American Journal of Pharmacy*, 1894 : 299.

23. "Cultivation of Ginseng."—*American Journal of Pharmacy*, 1894 : 399.

24. "Oils of Wintergreen and Birch."—*American Journal of Pharmacy*, 1895 : 560.

25. "Report on Tannins."—*American Journal of Pharmacy*, 1895 : 516.

26. "Recent Literature on the Soja Bean."—*American Journal of Pharmacy*, 1896 : 309, 350.

27. "The Tannin of Some Acorns."—*American Journal of Pharmacy*, 1896 : 601, 634.

28. "North American Coniferæ, with Professor Edson S. Bastin."—*American Journal of Pharmacy*, 1896 : 21, 65, 136, 199, 242, 321, 383, 409, 554, 642. Republished in pamphlet form.

WILLIAM E. MEEHAN.

William E. Meehan, the oldest son of Thomas Meehan, was born at Holmesburg, Philadelphia, August 31, 1853. He was educated in the private schools and learned the nursery and florist business, at the same time taking an active interest in scientific matters. He was one of the founders of the Germantown Natural History Society, started in 1868. This society turned out a number of able

men, such as Carvill Lewis, the geologist. In 1883 he abandoned the nursery business for literary pursuits, writing a number of stories for different papers. He became, in 1886, a reporter on the *Germantown Gazette*, and later its editor. He became, in 1887, a correspondent reporter for the Philadelphia *Ledger* until 1889, when he was made an associate editor, having charge of the science, including botany. When the relief expedition was sent out in 1892 to the assistance of Lieutenant Peary, who had wintered in the Arctic Regions, Mr. Meehan went as the botanist, the result of his scientific work being published in the *Proceedings of the Academy of Natural Sciences.* Mr. Meehan contributed to the *Public Ledger* a series of articles on "Notable Trees," and has written for various magazines. A large pamphlet of his on "Fish, Fishing and Fisheries of Pennsylvania," published by the State, is a valuable résumé of these interests in the Keystone State.

JOHN MUIRHEAD MACFARLANE.

John Muirhead Macfarlane was born in 1855 at Kirkcaldy, a busy manufacturing town within view of the Scottish capital.

He received his early education first at a private school, and later at the High School of his native place. In 1876 he matriculated at the University of Edinburgh, and began the study of botany under the late Professor John Hutton Balfour, in 1877. He was Senior Prizeman and Medalist in the class of practical botany, and obtained honors in the systematic class. At the same time he gained the Gilchrist Prize for a report, illustrated by a series of specimens, upon the fossil flora of the Edinburgh Coal Fields.

In the following year he was asked to assist in the class of practical botany, and to undertake some work in the University Herbarium. In 1880 he graduated Bachelor of Science, and was appointed Private Assistant to the late Professor Dickson, successor to Professor Balfour in the chair of botany. This position he retained till 1888, when he was appointed Principal Assistant by the University Senate.

In 1881 he was chosen Lecturer on Botany in the Royal Veterinary College, and was elected by the committee of St. George's College tutor to its recently established Correspondence Botany Classes. Here he was the first to introduce the system of transmitting numerous specimens at regular intervals for examination and description. This plan was continued by him for seven years, and has since been largely adopted by similar institutions.

In 1883 he graduated Doctor of Science, when he presented a thesis on "The Structure, Division, and History of Vegetable and Animal Cells." Shortly afterwards he was made Superintendent of the large herbarium of the University, located in the herbarium building at the Royal Botanic Garden. This post he held till 1888, when he resigned to aid in the development of the laboratory and museum departments.

In 1885 he was elected a Fellow of the Royal Society of Edinburgh, and to its "Transactions" he contributed papers on botanical subjects. In the same year he accepted the post of Acting Secretary of the Botanical Society, and for six years thereafter he edited the Society's yearly "Transactions."

In 1887 the Committee of the Association for the Uni-

versity Education of Women appointed him lecturer for the year, when his class was attended by sixty-two students. In 1888 he became Principal Assistant in the University, and was thus called on to direct large classes in lecture and laboratory work. He thus acquired exceptional opportunities for familiarizing himself with the work of all departments of a large botanical school, situated in the midst of one of the richest botanic gardens in the world. Teaching in the class-room, research in the laboratory, organization work in the herbarium and museum, or demonstration in the field, filled up the hours of a busy life.

In the early period of his Edinburgh life he amassed large collections of fossil plants, and published a paper "On Lepidophloios, a Genus of Coal Measure Plants." The fossils he presented to the museum of the botanic garden, where they are now deposited. His studies on cell structure, on pitchered insectivorous plants, on the minute structure of hybrids, on dicotyledonous stems, and many other topics, extended from 1883 to 1891, but are only in part published as yet.

In 1891 the Research Committee of the Royal Society voted him twenty-five pounds to publish investigations on hybrid plants. His results embodied in the "*Transactions of the Royal Society of Edinburgh*" attracted the attention of biologists to a large and important field for investigation. In the same year he made some remarkable discoveries regarding the sensitive movements of the Venus Fly Trap, which later were laid before the Botanical Section at the Washington meeting of the American Association. The completed research was published a year later in "*Contributions from the Botanical Laboratory of the University of Pennsylvania.*

Attracted by the wide field offered for earnest workers in this country, Dr. Macfarlane resolved, in the summer of 1891, to settle here, and during the winter of 1891 and 1892 elaborated several papers that have since seen the light. He also conducted University Extension Classes at Lansdowne and Haddonfield. The interest of the students in these and other centres was aroused; natural history societies were instituted, and all of them affiliated about three years ago as "The Delaware Valley Naturalists' Union," with a membership between 300 and 400.

In the summer of 1892 he was elected Professor of Biology in the University of Pennsylvania, and about a year later Professor of Botany. Immediately on his appointment to the latter chair, he submitted plans for the establishment of a botanical garden on the land surrounding the Biological School. Various circumstances conspired to prevent the accomplishment of this till the autumn of 1894, when he was asked to become Professor-in-Charge of the Biological School. Thereafter, through the fostering care of Provost Harrison and Vice-Provost Fullerton, the work steadily advanced, till now the University has a suite of ten plant-houses, a set of seed pits, upwards of eighty beds devoted to the natural orders of plants, rock gardens, lily ponds, a hardy fernery and a small arboretum.

With parties of the botanical students, Professor Macfarlane has examined the flora of the Blue Mountains, the Alleghanies, the southern states, as well as the region nearer Philadelphia. Extensive collections have been made, on these occasions, for the botanic garden, and in recognition of his services, the University Trustees appointed him Director of the Garden in June, 1896.

On October 10, 1897 was organized the Botanical Society of Pennsylvania, largely through the interest and energy of Professor Macfarlane. This Association has already done much active botanical work.

His published writings, in recent years, have mainly been on sensitive plants, and on the best methods of organizing botanical museums and gardens.

He is a member of the Royal Society of Edinburgh, Academy of Natural Sciences of Philadelphia, American Philosophical Society, and others.

Bibliography.

1. "Notes on the Action of some Aniline Dyes on Vegetable Tissues."—*Transactions of the Botanical Society of Edinburgh*, XIV : 190.

2. "On Lepidophloios, a genus of Coal Measure Plants."—*Transactions of the Botanical Society of Edinburgh*, XIV : 181.

3. "The Structure and Division of the Vegetable Cell.'—*Transactions of the Botanical Society of Edinburgh*, XIV : 192.

4. "Observations on Vegetable and Animal Cells." Part I.—*Transactions of the Royal Society of Edinburgh*, XXX : 585.

5. "On the Distribution of Honey-glands in Pitchered Insectivorous Plants."—*Nature*, XXXI : 171.

6. "On the Division and Conjugation of Spirogyra."—*Transactions of the British Association*, Aberdeen, 1885, 1088.

7. "On a Microscopic Fungus in Fossil Wood from Bowling."—*Transactions of the British Association*, Aberdeen, 1885, 1088.

8. "On a New Method of Preparing Epidermal Tissues of Pitcher-plants."—*Transactions of the British Association*, Aberdeen, 1885, 1088.

9. "Observations on Pitchered Insectivorous Plants." Part I.—*Annals of Botany*, III, 1889.

10. "Observations on Pitchered Insectivorous Plants." Part II.—*Annals of Botany*, VII, 1893.

11. "A Comparison of the Minute Structure of Plant Hybrids with that of their Parents, and its Bearing on Biological Problems."—*Transactions of the Royal Society of Edinburgh*, XXXVII : 203, Plates 1-8, 1892.

12. "Contributions to the History of Dionæa Muscipula."—*Contributions from the Botanical Laboratory of the University of Pennsylvania*, I: 7.

13. "Botanical Gardens and their Value."—*Alumni Report of the Philadelphia College of Pharmacy*, XXXII, February, 1896, p. 112.

14. "Irrito Contractility in Plants."—*Biological Lectures*, Wood's Holl. Session of 1893, p. 185.

15. "Sensitive Plants under Colored Screens."

16. "Observations on some Hybrids between Drosera filiformis and D. intermedia."—*Contributions from the Botanical Laboratory of the University of Pennsylvania*, II: 87.

17. "Proceedings of the Botanical Society of Pennsylvania.—*Transactions and Proceedings of the Botanical Society of Pennsylvania*, I: 111.

CHARLES SUMNER DOLLEY.

Charles Sumner Dolley, M. D., was born in Elyria, Lorraine County, Ohio, June 16, 1856. As Professor of Biology in Swarthmore College during 1885 and 1886, and as Professor of Biology in the University of Pennsylvania until 1892, his main work was in zoology. His botanical work was crystallized in a "Provisional List of the Plants of the Bahama Islands," published in *Proceedings of the Academy of Natural Sciences of Philadelphia* (1889, p. 349). Since 1892 Professor Dolley has taught the biological sciences, particularly botany, in the Philadelphia High School.

CHARLES S. BOYER.

Charles S. Boyer was of German and French parentage, descended from settlers who came to Montgomery County in 1750. His father was a strong Abolitionist, who, as a volunteer in a Pennsylvania regiment, after hard service, died in a Confederate prison.

He was born in Philadelphia in 1856, was educated in

the public school, and graduated, with honor, from the Central High School in 1874. In 1875 he entered the Academic Department of Brown University, graduating in the class of 1879. At the time of graduation Charles Boyer was honored with the position of class poet. In 1885 he received from Brown University the degree of A. M. Since graduation he has been engaged in teaching mathematics and the classics, and is, at present, a school supervisor of Philadelphia.

As a boy, his botanical education was chiefly gained from rambles around Philadelphia, his botanical collection quite extensively representing the flora of Pennsylvania, together with portions of New England. But for many years Professor Boyer's entire attention has been given to microscopical work, more especially to the group known as the *Diatomaceæ*. His collection includes several thousand slides of separate named forms, the result of hours of work. His library includes as large a number of works on *Diatomaceæ* as will probably be found in a private collection in this country, the result of many years collecting.

Professor Boyer's papers, thus far published, consist entirely of contributions to scientific journals, including articles on microscopic technique in the *Observer*, and others on the Diatoms in the *Bulletin of the Torrey Botanical Club*. His papers on botany are: "A Fossil Marine Diatomaceous Deposit at St. Augustine, Florida"; "A Diatomaceous Deposit from an Artesian Well at Wildwood, New Jersey." A translation of the latter paper appeared in a Parisian journal, *Le Diatomiste*, Vol. II. "The Mounting of Diatoms," *Practical Microscopy*, January and May, 1895.

The work upon which he is at present engaged is a "Synopsis of the Biddulphoid Forms of the Diatomaceæ, with complete Descriptions of Species occurring in North America and a Revision of the Classification." It is nearly completed.

Professor Boyer is a member of the following societies: American Microscopical Society, Torrey Botanical Club of New York, Academy of Natural Sciences of Philadelphia, Geographical Club.

CHARLES C. WILLIAMSON.

Charles C. Williamson was born in Philadelphia, November 1, 1857, and was educated in the private schools of the city. In 1877 he graduated from the University of Pennsylvania as a mechanical engineer. As a boy, he was interested more especially in entomology, until he became absorbed in botany, which was taken up as a side issue. Removing to Harrisburg, during his spare time he collected extensively about that place and around Johnstown, Pennsylvania, where, after leaving Harrisburg, he spent four years. Philadelphia then became his place of residence, Mr. Williamson being engaged as Professor of Drawing in Girard College and in the Spring Garden Institute. He has taken several botanical trips to Florida, two to Wilmington, North Carolina, and to the mountains of North Carolina, where he made extensive collections. The living plants collected on the latter trip were presented to the Botanic Garden of the University of Pennsylvania. His herbarium numbers some 2000 sheets. Mr. Williamson is a life member of the Academy of Natural Sciences and member of the Botanical Section.

HELEN ABBOTT (MICHAEL).

Helen Abbott (Michael) was born in Philadelphia, December 23, 1857. She left a musical career in 1883, and began her scientific studies, attending some lecture courses at the Woman's Medical College in Philadelphia, from 1883 to 1884. In 1884 she passed final examinations in anatomy, physiology and chemistry. From 1884 to 1888 Miss Abbott worked at the Philadelphia College of Pharmacy, under the direction of Professors Sadtler and Trimble. In 1888 she was married to Arthur Michael, a chemist. After her marriage she followed chemical studies and investigations with Mr. Michael, in their private laboratory on the Isle of Wight, for four years. For the last two years they have been working at Tufts College, Mrs. Michael working privately on the glucosides. Mrs. Michael is a member of the American Philosophical Society, and corresponding member of the Philadelphia College of Pharmacy. The following is a list of her papers on the chemical side of botany:

1. "Nutritive Value of Condiments."—*Polyclinic Journal*, 1883.

2. "Analysis of the Bark of Fouquieria splendens."—*Proceedings American Association Advancement of Science*, 1884, 190. *American Journal of Pharmacy*, February, 1885, 81.

3. "A Chemical Study of Yucca augustifolia."—*Proceedings American Association Advancement of Science*, 1886, 125.

4. "Preliminary Analysis of a Honduras Plant, 'Chichipate.'"

5. "Certain Constituents of Plants, considered in relation to their Morphology and Evolution."—*Botanical Gazette*, XI: 270.

6. "On Hæmatoxylin in the Bark of Saraca Indica."—*Proceedings Academy Natural Sciences*, Philadelphia, 1886, 352.

7. "Plant Chemistry as an Applied Science."—*Journal Franklin Institute*, 3rd Ser., XCIV: 1.

8. "The Chemical Basis of Plant Form."—*Journal Franklin Institute*, 3rd Ser., XCIV: 161.

9. "Plant Analysis as illustrated by the Production of Sugar from Sorghum."—*Proceedings Alumni Association American College of Pharmacy*, 1887.

10. "The Chemistry of the Lower and the Higher Plants."—*American Naturalist*, 1887, 719, 800.

11. "The Occurrence of Solid Hydrocarbons in Plants."—*American Chemical Journal*, X: 439. (1888.)

JOSEPH CRAWFORD.

Joseph Crawford was born December 20, 1858, within sound of the water of the Perkiomen, made famous by Audubon, Say, Wilson, and others. His early education, until he was fifteen or sixteen years of age, was spent at the county schools, together with a two years' course at the High School at Norristown, where he finished his scholastic career. Even then his interest in botany showed itself. He graduated in 1884 from the Philadelphia College of Pharmacy, where he attended the lectures and studied botany under the late Professor John M. Maisch. While a druggist at Tuckerton, New Jersey, he collected plants in that neighborhood and became much interested in the flora of New Jersey. Entering business for himself in Philadelphia, in 1884, his botanical studies were carried on spasmodically until 1892, when he associated himself with the late Dr. J. Bernard Brinton, accompanying that botanist in his outings. Through Dr. Brinton, Mr. Crawford became interested in the Academy of Natural Sciences, and also of the Botanical Section.

He, with Dr. Brinton, was instrumental in the foundation of the Philadelphia Botanical Club, which meets monthly and has for its object the study of the plants found especially within a radius of sixty miles of the city. As Chairman of the Botanical Committee of the Pennsylvania

Pharmaceutical Association, Mr. Crawford has entered heartily into the plan of making a check-list of Pennsylvania plants, his herbarium containing many plants of very local distribution.

GEORGE MAHLON BERINGER.

George Mahlon Beringer was born in the city of Philadelphia, February 3, 1860, and was educated in the city schools, being graduated from the Central High School in the year 1876. He immediately began the study of the drug business with the well-known firm of Bullock & Crenshaw, with whom he remained until 1892, when he purchased the store of the late Albert P. Brown, in Camden, New Jersey. He was graduated by the Philadelphia College of Pharmacy in 1880, taking for the subject of his thesis "Citrate of Caffeine." He began writing for the *American Journal of Pharmacy* in 1882. His papers, numbering over forty articles, are of a very general interest, covering formulas of practical pharmaceutical interest for every worker in the drug store, such as syrupus aurantii, syrupus lactucarii, tinctura moschi, tinctura strophanthi, essence of pepsin, solution of malate of iron, mullein oil, an improvement in Liebig's condensers, phenol sodique, and resin of podophyllum. In chemistry, his papers include "The Nature and Manufacture of Aristol," "Quinine Bimurias, Bromoform, Determination of Melting Points," "Formula for Liquor Carbonis Detergens," "The Four Chlorides," "Ung: Boroglyceride," "Notes on the Oleo-Resins," and a paper on "Oil of Bay," "Pimenti and Cloves," "Hypophosphorous Acid," "The Tritration of Ammonium Carbonate," "Purification of Benzin, Aleates, Phytoxylin," and one on "The Value of Ehrlich's Test in Urinalysis."

His papers on the literature of pharmacy consist of translations, a critical revision of the United States Pharmacopœa of 1890, a paper on "The Apocynaceæ in Materia Medica," one on "The Recognition of Elixirs by the Pharmacopœa," "Notes on the Rhus Poisoning," "Notes on the Genus Myrica," on "The Different Commercial Varieties of Vanilla," with illustrations; "Notes on Loco Weeds," "Sophistication of Insect Powder with Hungarian Daisy," "Adulterations of Elm Bark," and also one on "The Sophistication of Flaxseed Meal," and a valuable paper on "Expressed Oil of Almonds." These all appeared in the *American Journal of Pharmacy*. The editor of *Parrish's Pharmacy* received valuable assistance in the revision of the fifth edition. He furnished a review of the "National Formulary" for the Polyclinic, which was reprinted in the *Druggist Circular* in 1889. A supplementary paper upon "The Oil of Bay" was published by him in the *Druggist Circular*. He furnished an article for the *Pharmaceutical Journal and Transactions*, upon "Pharmacy in America," which appeared in January, 1890.

Mr. Beringer has been active as a field botanist, and has contributed many interesting plants to the Herbarium of the Philadelphia Botanical Club.

T. CHALKLEY PALMER.

T. Chalkley Palmer was born October 23, 1860, near Media, Pennsylvania; the son of Lewis Palmer, a local mineralogist and botanist. He was educated at Westtown Boarding School, Chester County, Pennsylvania, and at Haverford College, Pennsylvania, graduating from the latter in 1882.

GEORGE M. BERINGER.

UNIVERSITY OF ARIZONA
LIBRARY

Professionally, he is a chemist, having, as chemist of the Sharpless Dye-wood Extracting Company since 1882, paid especial attention to dyestuffs.

Since 1874 he has been a student of botany, his studies being mostly confined to the local flora, especially that of Delaware County. He has been enabled to make several additions to the flora of the county, contributed to the records of the Delaware County Institute of Science, Media, Pennsylvania. He has been a member of the Botanical Committee of that society for six years, Chairman of the Committee two years, and President since 1894, having been re-elected in 1894 and 1896. Lately, Mr. Palmer and his brother, John Palmer, have interested themselves in the study and collection of diatoms.

Mr. Palmer has written several popular science articles for *The Student*, *The Friend*, and the Philadelphia *Weekly American*. A paper on "Isoetes Saccharata" appeared in the *Botanical Gazette* for January, 1895, and one on "Respiration in Diatoms," in *Proceedings of the Academy of Natural Sciences*, 1897.

Mr. Palmer is a member of the Society of Chemical Industry (British), the Society of Dyers and Colorists (British), Société Chimique de Paris, the Franklin Institute, the Academy of Natural Sciences, Philadelphia.

F. D. CHESTER.

F. D. Chester was born October 10, 1861, and was educated at Washington University, St. Louis, Missouri, and at Cornell University, where he received the degree of B.S. in 1882, and M.S. in 1885. From 1882 to 1885, he was Professor of Geology and Mineralogy in Delaware

College. Between 1885 and 1894 he occupied the chair of geology and botany in the same institution. During this time he was mycologist for the Delaware College Agricultural Experiment Station, in connection with which institution he has done most of his botanical work. In 1887 he was elected a Fellow of the American Association for the Advancement of Science; in 1889, a Fellow of the American Geological Society, and 1892, a member of the Society for the Promotion of Agricultural Science.*

IDA A. KELLER.

Dr. Ida A. Keller was graduated from the Girls' High School of Philadelphia in 1883. From 1884 to 1886 she was a student in the Department of Biology in the University of Pennsylvania, and the year following was assistant in the herbarium at Bryn Mawr College.

From 1887 to 1889 Dr. Keller was a student at the University of Leipzig with Professor Wilhelm Pfeffer, the leading plant physiologist of the day, and with Professor Friedrich Stohmann in chemistry. In 1889 and 1890, she was a student at the University of Zurich, where she received the degree of Doctor of Philosophy.

The two years following, Dr. Keller was Lecturer in Botany at Bryn Mawr College, and from 1893 to the present has been Teacher of Chemistry and Director of the Natural History Department at the Girls' High School.

She is a member of the Academy of Natural Sciences, of the Philadelphia Botanical Club, and has undertaken, under the auspices of the club, the compilation of a "Flora of Philadelphia and Vicinity."

* For Geological papers see *Am. Jour. Sci.; Proceedings of A. A. A. S.; Phila. Acad. Nat. Sci.; Second Geol. Survey of Penna. and U. S. Geol. Survey.* For botanical papers see *Reports of Del. College Agr. Expt. Sta.*

In a paper* entitled "Notes on the Cross-Fertilization of Flowers by Insects" (*Proceedings Academy Natural Sciences*, Philadelphia, 1896), Dr. Keller boldly challenged the assertions of Darwin and others, that cross-fertilization of flowers is of utmost value to the individual species, and supports the contention of the opposing school that the great bulk of colored flowering plants are self-fertilized; that self-fertilizers are every way as healthy and vigorous, and immensely more productive than those dependent on insect aid; and, finally, that where plants are so dependent, they are the worst fitted to engage in the struggle for life, the great underlying principle in natural selection. As a result largely of Dr. Keller's paper, the *Gardener's Chronicle*, commenting on her deductions, says:

"It will certainly be somewhat of a shock to some conservative people to hear that the cherished convictions have been ruthlessly undermined. It seems we must give up believing that nature loves cross-fertilization, and adapts herself to it, and that the lovely hues of flowers are due to insects. The evolutionist must set to work and get some new theories to suit these *fin de siecle* opinions. How can we account for the beautiful colors and beautiful scents which please our senses, but apparently do not please insects at all? We must have more experiments before the question of relation between flowers and insects can be satisfactorily settled."

Bibliography.

1. "Uber die Protoplasma Strömung im Pflanzenreich." Zurich, 1890.

2. "The Phenomena of Fertilization in the Flowers of Monarda fistulosa."—*Proceedings Academy Natural Sciences*, Philadelphia, 1892.

* See editorial, *Public Ledger*, Thursday, October 29, 1896.

3. "The Glandular Hairs of Brasenia peltata, Pursh."—*Proceedings Academy Natural Sciences*, 1893.

4. "The Jelly-like Secretion of the Fruit of Peltandra undulata, Raf."—*Proceedings Academy Natural Sciences*, 1895.

5. "On the Color in the Aril of Celastrus scandens."—*Proceedings Academy Natural Sciences*, 1896. Reported in the *Public Ledger*.

6. "Notes on the Study of the Cross-Fertilization of Flowers by Insects."—*Proceedings Academy Natural Sciences*, 1896.

A. ARTHUR HELLER.

A. Arthur Heller, the youngest of a family of five sons, was born March 21, 1867, in Montour County, Pennsylvania. Always averse to the life of a farmer, an opportunity to learn the "arts and mysteries of printing" was given him in 1881. Accordingly, his mother, a widow since his birth, removed to Lancaster, where his oldest brother, now Rev. C. B. Heller, of Mt. Crawford, Virginia, was just beginning his course in the Theological Seminary of Franklin and Marshall College. About September 10, 1881, he entered the service of the Inquirer Printing & Publishing Company, now the Wickersham Company. After two years' work as a journeyman, he entered the Academy of Franklin and Marshall College, and five years later, in 1892, graduated from the college with the degree of B. A.

His mother at that time had several students in her house as boarders, who were engaged just then in studying botany. The plants which they brought in from their trips seemed very beautiful to the boy, who had to spend ten hours a day at the type case, with very few opportunities to get out into the country. To a girl friend, in 1884, who is now his wife, and who was then in the High School, and also studying botany, he confided his opinion that botany must be a very nice study, and that he wished he

could have a chance at it. She offered her services as teacher, and put him to work at Gray's Lessons.

In the fall of 1888, he entered the Freshman class of Franklin and Marshall College, where the acquaintance of a classmate, John K. Small, who was much interested in botany, was speedily made. The two at once became inseparable companions, and spent all their spare time in botanizing. During the fall of 1888, and spring of 1889, not a week passed without at least one collecting trip being made. It was mainly during this time that the fifty or sixty additions to the known phanerogamous flora of Lancaster County were made.

The vacation of 1889 was spent by Mr. Heller in the neighborhood of his birthplace, the greater part with his brother, A. C. Heller, at Berwich, Columbia County, Pennsylvania. While here, he began a correspondence with the veteran botanist, Dr. Thomas C. Porter, of Lafayette College, Easton, Pennsylvania, and collected a number of plants for him.

Having decided to visit his oldest brother, Rev. B. C. Heller, then located near Salisbury, North Carolina, during the vacation of 1890, Dr. Porter and Dr. N. L. Britton, of Columbia College, New York, kindly advanced funds and assisted him in disposing of sets of the plants collected.

This visit to the "Tar Heel" State was a very enjoyable one, and introduced him to many new plants. The greater part of the time was spent about Heilig's Mill, at the parsonage, twelve miles south of Salisbury. Between this place and Salisbury is a tract of granite containing many rare plants. But the crowning event of the summer was a visit to Blowing Rock, where some three weeks were

spent. This is a summer resort, in the crest of the Blue Ridge, at 4000 feet elevation. Grandfather was the first mountain visited. This grand old mountain, classic in the annals of southern botany as the foraging ground of botanists from the elder Michaux to the present time, stands like an immense sentinel some ten miles west of Blowing Rock. Trips were also made to Table Rock (which Dr. Gray always would call Table Mountain), thirty-five miles distant, and to Roan, fifty miles west. Three new species were collected: *Solidago Roanensis* Porter, on the slopes of Roan; *Liatris Helleri* Porter, on the "blowing rock," and *Lotus Helleri* Britton, at Heilig's Mill. *Pentstemon Smallii* Heller was collected in fruit, but not named until four years later.

So well pleased were he and Mr. Small with the results of this trip, that they decided to make it in company during the next vacation. Accordingly, early in June they started, stopping at Lynchburg, Virginia, to make a side trip to Roanoke. Here they obtained a number of rare plants, among them the recently published *Oxalis grandis* Small and *Oxalis recurva* Ell. A stop was also made at Fall Creek, near Danville, and a number of species collected, one of which was *Senecio Smallii* Britton. Only a few days were spent at Heilig's Mill, and by June 10, they were quartered at Blowing Rock. *Pentstemon Smallii*, with its handsome rose-purple flowers, was in full bloom, and so, too, was *Rhododendron Catawbiense*, and occasional belated bushes of *Azalea lutea.* Two delightful months were spent in the mountains. Grandfather was visited three times, and Roan and Table Rock once. On the slopes of Grandfather the long-neglected *Lilium Carolinianum* Michaux was found in

quantity. *Thalictrum coriaceum* (Britton) Small, which occurs all through that region, was collected at Blowing Rock, and *Thalictrum macrostylum* (Shuttle), Small and Heller, at Hickory, in a meadow. *Thalictrum polygamum*, with which the latter has been associated as a variety, was not seen, and probably does not occur in western North Carolina. Upon returning from the mountains, a few days were again spent at Heilig's Mill, and a trip made to the falls of the Yadkin River, a very picturesque place, and of much botanical interest. *Solidago Yadkinensis* (Porter) Small and *Acer leucoderme* Small were obtained on this day.

The distribution of the plants collected during this and the preceding year brought Mr. Heller to the notice of American botanists, and very unexpectedly in March, 1892, came an offer from Rev. George Vasey, Botanist of the Department of Agriculture, to join a botanical expedition then being organized to make explorations in northern Idaho. As the work of the senior class was almost over, permission was readily granted him to take his examinations in advance, and on April 11th he started for Minneapolis, Minnesota, where the party was organized. The party was commissioned for five months, and in that time traveled through some interesting country, from the mouth of the Clearwater River to the north shore of Lake Pend d' Oreille.

In December of that year he visited New York, and became personally acquainted with Dr. Britton. In February, 1893, he again went to New York, where he spent two or three months, working with Dr. Britton. The collecting season was spent in Virginia, principally in the

south-eastern part. A trip was also made to White Sulphur Springs, West Virginia, after the rare *Clematis ovata* Pursh and *Trifolium Virginicum* Small. Two trips were also made to the mountains of North Carolina after rare species. During the season several new species were collected, and a number added to the Gray "Manual Range."

Upon the opening of Columbia College, in October, he entered upon a post-graduate course, but circumstances compelled him to abandon it early in December. He immediately decided to spend the following season in Texas, and March 3, 1894, found him located at Corpus Christi. Four months were spent at Corpus Christi and Kerville, a small town seventy miles west of San Antonio. The Lone Star State proved the best botanical ground yet visited. Some ten or fifteen new species were discovered, and many rare ones collected. On the way to the collecting field he spent a day with the Director of the Missouri Botanical Garden, Dr. William Trelease. The results of his visit to Texas were incorporated in a report entitled: "Botanical Explorations in Southern Texas during the Season of 1894." In it are 116 pages of descriptive matter, including lengthy critical notes on many species.

Part of July and August was spent at Washington, determining the Texas collection at the National Herbarium, and later, some weeks at New York, verifying doubtful species. As a member of the Torrey Botanical Club, and an Associate Editor of the *Bulletin*, visits to the metropolis now became rather frequent.

At the close of 1894, there being a vacancy at the Missouri Botanical Garden, Professor Trelease kindly offered him the position of Assistant, but the offer was regretfully

declined, as he had decided to visit the Hawaiian Islands, long famous for their unique flora. Honolulu was reached March 15, 1895, and eight months spent on the islands of Kauai and Oahu. Of both flowering plants and cryptogams, about seventy-five new species were discovered.

While at San Francisco, the botanists of the University of California, at Berkeley, and of Leland Stanford, Jr., were visited, and nearly all of the time spent at the herbarium of the California Academy of Sciences.

Early in December he again arrived in Lancaster, and after Christmas repaired to New York to verify the determinations made from Hildebrand's "Flora of the Hawaiian Islands."

In April, 1896, Mr. Heller and wife started for Idaho to spend the summer in collecting. Two months were spent at Lewiston, at the junction of the Clearwater and Snake Rivers, and the same length of time in the Craig Mountains, at Lake Waha and Forest, twenty and thirty-five miles respectively, south of Lewiston. The usual number of interesting species were collected, among them a dozen or more new ones.

While at Lewiston an offer of the position of Assistant Botanist of the Geological and Natural History Survey was tendered him and promptly accepted. He was later located at the University of Minnesota, Minneapolis, where he had charge of the rapidly growing herbarium of that institution. In March, 1898, was issued by Dr. Heller a new check list of North American plants. It contains a list of 14,534 names, an increase of 2000 names over any catalogue previously issued. It is the direct outcome of Dr. Heller's connection with the large herbarium at the

University of Minnesota. Dr. and Mrs. Heller started in 1898 on a botanical trip to the newly acquired tropical island, Puerto Rico, under the auspices of the New York Botanical Garden. They returned in June, 1899, with a large collection of plants, especially from the northern side of the island.

Bibliography.

1. "Notes on the Flora of North Carolina."—*Bulletin Torrey Botanical Club*, XVIII: 186, 1891, pp. 7.

2. "A Botanical Trip."—*College Student*, Franklin and Marshall College, 1891.

3. "On the Flora of North Carolina and Contiguous Territory."—*Memoirs Torrey Botanical Club*, III, No. 1, 1892, pp. 39.

4. "Asplenium Bradleyi, Eaton."—*Bulletin Torrey Botanical Club*, XX: 18, 1893, pp. 2.

5. "Preliminary Report on the Flora of Luzerne County, Pennsylvania."—*Bulletin Torrey Botanical Club*, XX: 55, 1893, pp. 13.

6. "Preliminary List of the Lichens of Lancaster County, Pennsylvania, Lancaster, Pennsylvania," February, 1893, pp. 4.

7. "Plants from Virginia new to Gray's Manual Range, with Notes on other Species."—*Bulletin Torrey Botanical Club*, XXI: 21, 1894, pp. 7.

8. "A Request."—*Bulletin Torrey Botanical Club*, XXI: 314, 1894, pp. 7.

9. "Botanical Exploration in Southern Texas during the Season of 1894."—*Contributions to Herbarium*, Franklin and Marshall College, Lancaster, Pennsylvania, No. 1, February 6, 1895. Plates 1-9, pp. 116.

10. "Notes on Kuhnistera."—*Bulletin Torrey Botanical Club*, XXIII: 117, 1896. Plate 262, pp. 9.

HENRY KRAEMER.

Henry Kraemer was born in Philadelphia on July 22, 1868. His parents died when he was in his third year. Thrown upon the world, he was admitted to Girard College, from which institution he graduated in 1883, being awarded the first prize scholarship. On January 1, 1884, he was

apprenticed to Dr. Lowe, and during the five years of apprenticeship was a student of the Philadelphia College of Pharmacy, graduating with the class of '89. Up to this time the field of medicine was his ambition; but the work of the senior year, while he was engaged on a thesis on the "Microscopical and Chemical Study of White Oak Bark," caused him to turn his energies in a pharmacognostical direction. The result of this thesis brought him the John M. Maisch microscope prize, as well as the Henry C. Lea prize of one hundred dollars for the best thesis of the class. For a short time he was an assistant to Professor S. P. Sadtler at the University of Pennsylvania, and was called from this position in 1890 as an Instructor in Pharmacognosy, etc., to the College of Pharmacy of the City of New York. Here he labored for two years, but in the meantime became convinced that he needed further preparation for the work he wished to do; so, in the second year, he began a course of study at the School of Mines of Columbia University. In 1895 he completed this course and was awarded the degree of Bachelor of Philosophy.

In April, 1895, he became Professor of Botany, Pharmacognosy and Materia Medica at the School of Pharmacy of the Northwestern University, with the privilege of spending a year abroad. During this year, an "arbeit" was undertaken and finished, with the approval of the Faculty of the University of Marburg. This, with the successful passing of the required examination, brought him his degree of Doctor of Philosophy.* In 1897 Dr. Kraemer was elected Professor of Botany in the Philadelphia College of Pharmacy, to fill the vacancy caused by the death of Professor Bastin.

*Philadelphia *Ledger*, May 8, 1897, with portrait.

From 1892 to 1895 he was a reporter for the *Progress of Pharmacy*, of the American Pharmaceutical Association, and for a while was the editor of the *Alumni Journal*, of the College of Pharmacy of the City of New York. He was Secretary of the Botanical Society of Pennsylvania, during 1897 and 1898, and has been acting editor of the *American Journal of Pharmacy* since the death of Professor Henry Trimble.

Bibliography.

1. "Tannin of Quercus alba."—*American Journal of Pharmacy*, 1890, 236.

2. "Fungi."—*American Journal of Pharmacy*, 1894, 424.

3. "A Microscopical and Chemical Examination of Cloves."—*American Journal of Pharmacy*, 1894, 479.

4. "The World's Columbian Exposition from a Botanical Standpoint."—*American Journal of Pharmacy*, 1894, 80.

5. "The Materia Medica of Ceylon."—*American Journal of Pharmacy*, 1894, 530.

6. "The Violet Perfume."—*American Journal of Pharmacy*, 1895.

7. "Chinquapin (Castanea pumila, Mill)."—*American Journal of Pharmacy*, 1895, 453.

8. "The Pharmacist and the Microscope."—*American Journal of Pharmacy*, 1897, 398.

9. "Botanical Study of Viola tricolor."—*Inaugural Dissertation, Marburg*, 1897.

10. "Examination of Powdered Drugs."—*American Journal of Pharmacy*, 1897, 523.

11. "Asarum Canadense."—*American Journal of Pharmacy*, 1898, 144.

12. "Note on Saffron."—*American Journal of Pharmacy*, 1898, 386.

13. "Qualitative Examination of Powdered Vegetable Drugs."—*American Journal of Pharmacy*, 1898, 506, 558, 607.

14. "The Study of Starch Grains and its Application."—*American Journal of Pharmacy*, 1899, 174.

15. "Origin and Detection of Mucilage in Plants."—*American Journal of Pharmacy*, 1899, 267, 285.

16. "On the Morphology of the Genus Viola."—*Bulletin Torrey Botanical Club*, XXVI: 174.

JOHN WILLIAM HARSHBERGER.

John William Harshberger* was born in Philadelphia, January 1, 1869, of indigenous American stock, his ancestors on his father's (Abram Harshberger, M.D.,) side having immigrated to Central Pennsylvania from near Coblenz on the Rhine, in 1735, and on his mother's (Jane Harris Walk) side just prior to the outbreak of the French and Indian Wars in 1755. He claims German ancestry on his father's side (Hirschberger, Rhone), and on his mother's, by intermarriage, Scotch-Irish (Brown, Oliver), English (Harris) and Sclavic (Walk). He went while a child to the kindergarten taught by an aunt. Until nine years of age, he was taught at home; and during this time, in 1877, was created his love for botany and plants, having accompanied his aunt on the botanical excursions conducted by Professor Jacob Ennis to the country in the immediate vicinage of Philadelphia. At nine, he entered the public school at Haddington, West Philadelphia, and, by successive steps, passed through the entire public school system of Philadelphia, until his graduation from the Central High School, in June, 1888, with the degree of Bachelor of Arts. In 1888, he entered the Biological School of the University of Pennsylvania on one of the public school scholarships. His studies at the University engrossed all of his time for the next four years, when, in 1892, he received the degree of Bachelor of Science. In 1890, having spent some time in study at the Arnold Arboretum, Harvard University, he was appointed Assistant Instructor in Botany, serving under Professor Joseph T. Rothrock and Professor William P. Wilson, from whom he received a practical pedagogical

* A half-tone portrait appeared in *Traffic*, IV: 18, Philadelphia, March, 1895.

training, his theoretical knowledge of pedagogy being obtained in 1892–'93, while a member of the University Extension Seminar.

Having combined with his studies for the bachelor's degree the branches leading to the degree of Doctor of Philosophy, in June, 1893, he was granted that degree by the University, having prepared as a thesis, "Maize: A Botanical and Economic Study," which was published in Vol. I, No. 2, *Contributions from the Botanical Laboratory, University of Pennsylvania.* This piece of work was noticed favorably in botanical journals, both at home and abroad. The pamphlet of one hundred and twenty-five pages was later translated into Spanish by Dr. Nicolas Leon, of Mexico.*

In 1893 he was appointed Instructor in Botany, Biology and Zoology at the University, in the Veterinary Department, where he teaches botany, general biology and zoology, and in the School of Biology, where he teaches botany. In order to make his lectures in the Veterinary School more attractive and interesting, Dr. Harshberger drew in colored crayons a series of three hundred or more botanical and zoological wall charts. These are mounted on muslin, the crayon being fastened permanently to the black pattern paper by means of gum mastich dissolved in alcohol. In the fall of 1896 Dr. Harshberger was appointed a lecturer in the Philosophical Faculty of the University, where, as one of the teachers, he will give instruction to the student candidates for the degree of Doctor of Philosophy.

For three years, ending 1895, he was one of the staff of

* *El Maiz. Estudio Botánico y Económico* por John W. Hars[h]berger, Ph. D., (Universidad de Pensilvania) Traduccion, octavo, 164 pp. Mexico. 1894.

teachers at the Rittenhouse Academy, Philadelphia (Dr. De B. K. Ludwig and Professor E. B. Waples, Principals), instructing the students in chemistry, physics and astronomy.

In June, 1895, he was asked to revise the botanical words and terms in Worcester's Dictionary, which was undergoing revision at Lippincotts. This work, besides the lectures delivered before the University Archeological Association on ethno-botanical subjects, and his professional duties at the University, have given him little spare time for exhaustive original research, to which he is most inclined. During the month of July, 1896, he delivered before a class of teachers and others interested in botany, attending the Summer School of the American Society for the Extension of University Teaching, a course of lectures on "The Natural History of Field and Garden Plants," as also during the fall of 1896 a course on fungi in the department of the University for teachers. In 1897 he was one of corps of lecturers in the Department of Lectures, University of Pennsylvania.

Dr. Harshberger is a member of the Philadelphia Botanical Club, in the meetings of which he takes a deep interest, having made several communications to that body, notably on his observations on *Talinum teretifolium* of the serpentine barrens of Chester County, and on the flora of Luray, Virginia, and vicinity, which he visited in 1894. He is also a member of the Pennsylvania Forestry Association, the University Field Club, and of the Delaware Valley Naturalists' Union, having been the Treasurer of the latter association during 1895–1896, and President of the Field Club at the same time. In 1898 he was elected

Treasurer of the newly organized Botanical Society of Pennsylvania, to which he has made several interesting communications.

Besides these duties, Dr. Harshberger has had time to write articles for the botanical and educational press, a list of which papers is given below. His private herbarium, mounted and classified, consists of some 1500 sheets, representing so many species, and his botanical library some 300 volumes, very rich in the scientific bulletins and reports issued by the United States Department of Agriculture, as also in the more recent German works and translations.

He has done considerable collecting in the neighborhood of Philadelphia, in Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and is conversant with the flora of the pine barrens and cedar swamps of New Jersey. In the summer of 1892 he visited Europe, and while abroad spent some time at Kew, and the Jardin des Plantes, visiting also Rothamsted, the celebrated experimental farm.

During the latter part of the summer of 1896, having completed the revision of the botanical words for the English dictionary, Dr. Harshberger took a trip to Mexico, where he botanized extensively. The flora of the Valley of Mexico was especially studied, the results of which study are given in several publications, noticed at the end of this sketch. During his sojourn in Mexico, side trips were taken to the tropical forests at Cordoba, Orizaba and the palm forests and tropical forests on the Tampico Branch of the Mexican Central Railroad, as also to Guadalajara, where extensive collections of living, dried and alcoholic plants were made. On the way to and from Mexico, opportunity was afforded him to study the flora of

southwestern Texas, along the Rio Grande. The preliminary results of this Mexican trip were published in a paper in the *American Journal of Pharmacy*, November, 1896, a translation of which paper, by Dr. Nicolás León,* appeared in a Mexican newspaper, *El Tiempo*, for December 4, 1896.

During the summer of 1897 he took a six weeks' trip to California and the Northwest. While in California he visited the primeval redwood forests on Humboldt Bay, near Eureka, California, being accorded the privileges of the lumbering camps situated there. He also visited the Calaveras and Tuolumne big tree groves, and became thus acquainted with the magnificent grandeur of *Sequoia gigantea*, *Pinus ponderosa* and *P. Lambertiana*. The Yosemite Valley was visited on this trip, and here he had the opportunity of botanizing. On the homeward journey a visit was paid to the forests of the State of Washington, and a trip of seven days was made through the Yellowstone National Park, where the flora of the Park, especially of the geysers and hot springs, was studied.

The summer vacation of 1898 was spent abroad. A hasty run was made through Ireland, Scotland, England, Holland and France, where the several important centres of botanical interest were visited. Most of the time abroad was spent in studying the laboratories and methods of the German universities. The laboratories at Bonn, Berlin, Dresden and Munich were inspected. Here Dr. Harshberger made the personal acquaintance of the leaders of

* Dr. Nicolás León, of Mexico, was born at Quiroga, State of Michoacán, December 6, 1859. He adopted the career of medicine and obtained the degree of Doctor of Medicine in 1883. He was Professor of Botany in the national colleges of Morelia and Oaxaca. He has published a number of botanical papers and translations, noticed in his book, *Biblioteca Botánico Mexicana*, octavo, 372 pp., Mexico, 1895.

botanical thought abroad. Two weeks were spent amidst the alpine flora of the Bernese Oberland, the Mount Blanc range and the neighborhood of Zermatt, within sight of Monte Rosa and the Matterhorn. A number of botanic gardens were visited: Dublin, Edinburgh, Cambridge, Kew, Royal Society, Amsterdam, Bonn, Berlin, Dresden, Vienna, Munich, Zurich, Berne, Paris and Oxford. Many suggestions came to him in comparing the American botanical institutes (most of which he has personally visited) with those of England and of the continent. Much inspiration was derived from this trip abroad. An inspection of the museums suggested many lines of work in connection with his ethno-botanical studies.

Bibliography.

1. "A Few Pennsylvania Forestry Statistics."—*Forest Leaves*, II: 37, March, April, 1889.

2. "The Wissahickon Woods."—*Garden and Forest*, IV: 129 (1891).

3. "Plants for the Seashore."—*Garden and Forest*, V: 45, January 27, 1892.

4. "An Abnormal Development of the Inflorescence of Dionœa."—*Contrib. Bot. Lab., University of Pennsylvania*, I: 45.

5. "Maize: A Botanical and Economic Study."—*Contrib. Bot. Lab. University of Pennsylvania*, I: 75, 202.

6. "A Philadelphia Court of Honor."—Philadelphia *Ledger*, December 7, 1893.

7. "An Additional Poisonous Plant."—*Botanical Gazette*, XIX: 159, April, 1894, *Garden and Forest*, VII: 170.

8. "Geographical Biology."—*Education*, XIV: 513, May, 1894.

9. "James Logan, an Early Contributor to the Doctrine of Sex in Plants."—*Botanical Gazette*, XIX: 307, August, 1894.

10. "Plant Forms on Mexican and Central American Tablets." *American Antiquarian*, XVI: 299, September, 1894.

11. "The Origin of Our Vernal Flora."—*Science*, N. S., I: 92, January 25, 1895.

12. "The Origin of Paper and Cloth."—*Traffic*, IV : 18, March, 1895.

13. "When is Rhus toxicodendron Most Active?"—*Garden and Forest*, VIII : 239.

14. "Review of Dennert's Vergleichende Pflanzenmorphologie."—*Science*, N. S., II : 311, September 6, 1895.

15. "El Maiz Estudio Botánico y Económico." Translation of (6) by Dr. Nicolás León.—*Guadalupe-Hidalgo*, Mexico, 1894.

16. "Museum and Garden."—*Daily Evening Telegraph*, Philadelphia, XLIV : 5, October 26, 1895.

17. "The Botanists of Philadelphia." A Preliminary List. Circular Letter dated October 30, 1895.

18. "The Need of Competent Plant Doctors."—*Education*, XVI : 140, November, 1895.

19. "Some New Ideas Ethno-Botany."—Brief of Lecture. *Evening Telegraph*, Thursday, December 5, 1895.

20. "Donations to the Botanical Museum."—*The Pennsylvanian*, December 2, 1895, p. 3.

21. "Ethno-Botanic Gardens."—*Science*, N. S., III : 203, February 7, 1896.

22. "The Purposes of Ethno-Botany."—*Botanical Gazette*, XXI : 146, March, 1896. *American Antiquarian*, XVII : 73, March, 1896.

23. "Is the Pumpkin an American Plant?"—*Science*, N. S., III : 889, June 19, 1896.

24. "Some Recent Mexican Publications."—*Science*, N. S., IV : 539, October 9, 1896.

25. A Botanical Excursion to Mexico."—*American Journal of Pharmacy*, LXVIII : 588, November, 1896.

26. "Fertile Crosses between Teosinthe and Maize."—*Garden and Forest*, IX : 522.

27. "Una Excursion botánica á Mexico." Translation by Dr. Nicolás León.—*El Tiempo, Diario Catolico*, Ano XIV, number 3968. Viernes, 4 de Diciembre de 1896 (Friday, December 4, 1896).

28. "Would make a good Park."—*Public Ledger*, February 1, 1897, p. 9.

29. "Notes on the Hybrid of Maize and Teosinthe."—*Garden and Forest*, X : 48, February 13, 1897.

30. "A Communication."—*The Pennsylvanian*, February 13, 1897.

31. "Natural History, Charts and Illustrations."—*Education*, XVII: 493, April, 1897.

32. "An Ecological Study of the genus Talinum, with Descriptions of Two Species."—*Bulletin Torrey Botanical Club*, XXIV: 178, April, 1897.

33. "John Evans and His Garden."—*Garden and Forest*, X: 182, May 12, 1897.

34. "The Native Dahlias of Mexico."—*Science*, N. S., VI: 908, December 17, 1897.

35. "The Vegetation of the Yellowstone Hot Springs."—*American Journal of Pharmacy*, LXIX: 625, December, 1897.

36. "Water Storage and Conduction in Senecio præcox from Mexico." Abstract of paper read at Ithaca, New York, before Society Botanical Physiologists and Morphologists.—*Science*, N. S., VII: 120. *Botanical Gazette*, February, 1898, p. 116.

37. "A Review of Our Knowledge of Phyto-Bezoars."—*The Journal of Comparative Medicine and Veterinary Archives*, XIX: 143, March, 1898.

38. "A Few Ecological Notes."—*Asa Gray Bulletin*, VI: 37, April, 1898.

39. "Home and School Window Gardens."—*Education*, XVIII: 555, May, 1898.

40. The Uses of Plants among the Ancient Peruvians."—*Bulletin of the Museum of Science and Art*, University of Pennsylvania, I: 146, April, 1898.

41. "A Mexican Tropical Botanic Station."—*The Botanical Gazette*, XXIV: 362, May, 1898.

42. "Abnormal Flowers of Verbesina."—*Asa Gray Bulletin*, VI: 67, August, 1898.

43. "Botanical Observations on the Mexican Flora, especially on the Flora of the Valley of Mexico."—*Proceedings Academy of Natural Sciences of Philadelphia*, August, 1898, 372, pp. 41.

44. "Peanut, Arachis hypogœa."—*Meehan's Monthly*, VIII: 191, December, 1898.

45. "Some Morphological Structure in Paulownia imperialis." Paper, read before Society of Plant Morphology and Physiology, New York, December, 1898. Abstracted in *American Naturalist* March, 1899.—*University Bulletin*, III: 160.

46. "The Names of the Big Tree of California."—*Forest Leaves*, VII: 25.

47. "Water Storage and Conduction in Senecio præcox from Mexico." —*Contrib. Bot. Lab. University of Pennsylvania*, II : 31.

48. "Statistical Information concerning the Production of Fruit in Certain Plants.—*Contrib. Bot. Lab. University of Pennsylvania*, II : 100.

49. "Thermotropic Movements in the Leaves of Rhododendron maximum L."—*Proceedings Academy of Natural Sciences*, 1899, 219, with 3 figures in text.

50. "Local Plant Names in New Jersey."—*Garden and Forest*, V : 395, January, 27, 1892.

51. "Transmitted Characteristics in a White Angora Cat."—*Science*, N. S., IX : 554, April 14, 1899.

52. "Origin of the Potato, Solanum tuberosum."—*Meehan's Monthly*, IX : 111, July, 1899.

ALEXANDER MACELWEE.

Alexander MacElwee was born in Glasgow, Scotland, January 28, 1869,—the first of a family that now numbers eleven. At an early age he was sent to one of the primary schools of his native city; thence to the public schools, where he received a good elementary education. At the age of twelve, he passed the highest standard with honors, and then went to work. His first experience was as an office-boy in a commission agent's office at a salary of three shillings per week. He remained here nearly a year, and then left for a better position in a wholesale drug warehouse. Here Mr. MacElwee helped to mix up compounds, bottle flavoring stuffs, and run errands. He remained here until October, 1883, when he left Glasgow to join his parents in the New World. He arrived in Philadelphia October 16, 1883, and shortly afterwards secured a position as gardener's boy in the garden of A. J. Drexel, at Thirty-ninth and Walnut Streets. At this time he knew absolutely nothing about plants; and so, shortly after, he conceived the idea of studying botany. During the year 1886, he first attended

the meetings of the Botanical Section of the Academy of Natural Sciences, and became at once interested. Mr. MacElwee remained at Drexel's garden for nearly four years, then secured a position in the nursery of Hugh Graham, at Eighteenth and Thompson Streets. Here he had charge of several houses—one entirely of ferns, another of palms, etc.

In 1888 he entered on a three years' apprenticeship as a bricklayer. This calling gave him a great deal of spare time, which he devoted to collecting plants, insects, minerals, etc. It was during this time that he mounted a magnificent collection of plants presented by the late Isaac C. Martindale to the Botanical Club. As soon as his apprenticeship had expired, he secured a position as assistant gardener in the garden of Hon. John Wanamaker, at Jenkintown, Pennsylvania. Here he remained for a time until he obtained a better-paying situation in the city.

Mr. MacElwee still continued his botanical rambles, hunting everywhere for strange plants. He traveled a great deal in the company of the late Dr. J. Bernard Brinton, who kindly helped him in many ways.

In April, 1894, he left the garden in Germantown to take charge of the Martindale Herbarium, which had been presented to the College of Pharmacy. Here, with the aid of about ten persons, he labored until the immense herbarium was in place. Over 1000 specimens were mounted, and upwards of 100,000 sheets labeled, representing over 250,000 specimens, completing the work about midsummer.

In September of the same year (1894), he was asked to become gardener of the proposed Botanic Garden at the University of Pennsylvania, where he spent some time, until the laying-out of this garden was completed.

Mr. MacElwee resigned his position as gardener to accept a position elsewhere in a private demesne. Recently he has become Curator of the Herbarium started in connection with the Philadelphia Commercial Museums, and has begun its development by initiating a correspondence and exchange with botanists in different parts of the world. He has written these articles:

1. "Notes on some Species of Cucumis."—*Garden and Forest*, VIII: 475.
2. "Vitis pterophora."—*Garden and Forest*, IX: 315.
3. "A Few Mormodicas."—*Garden and Forest*, IX: 66.

MORRIS E. LEEDS.

Morris E. Leeds, born in Philadelphia, March 6, 1869; educated at Westtown Boarding School and Haverford College, graduating B. S. in 1888; taught natural science at Westtown, 1888–'89; studied physics and mathematics at the University of Berlin, 1892–'93. Engaged in the manufacture and sale of scientific instruments with Queen & Co. Member of the Philadelphia Botanical Club and the Torrey Botanical Club.

JOHN GIFFORD.

John Gifford was born at May's Landing, New Jersey, February 8, 1870. When about sixteen years of age, he entered Swarthmore College, and was graduated from that institution with the degree of B. S. While at college, he devoted considerable of his time to general natural science, and after graduation he spent one year as a special student of mycology at the University of Michigan. The following winter, 1892–'93, Mr. Gifford traveled through the Bahamas and Florida. In company with Rev. John E. Peters, he has botanized considerably through southern New Jersey, and is one of the best posted persons on the flora of that

region. The year following his residence at Ann Arbor found Mr. Gifford at Johns Hopkins Hospital, studying bacteriology, accompanying the Johns Hopkins expedition to Jamaica, in the spring and summer of that year. The three years following he was Instructor in Botany at Swarthmore College until the end of his third year, when he was allowed leave of absence for four months, which he spent in Louisiana, British Honduras, Yucatan, Guatemala and Spanish Honduras. In the spring of 1894, Mr. Gifford was appointed Forester of the Geological Survey of New Jersey, and has since been devoting his entire energies to the prosecution of this laudable object, the protection and reforestration of the timber lands of New Jersey. As editor of *The Forester*, he has had the opportunity of molding public opinion both in his own and neighboring states in furtherance of the forestry cause. His "Report on Forestry" from the *Annual Report of the State Geologist*, for 1894, is both a valuable contribution to botany, especially ecological botany, and to forestry. Mr. Gifford, having pursued the forestry course, in the German Forestry School at Munich, will take his degree from that institution in 1898–'99, as a Doctor of Forestry. A few articles from his pen have appeared in *Garden and Forest*, as follows:

1. "Distribution of the White Cedar in New Jersey."—IX : 63.
2. "Reforesting Waste Lands in Holland."—IX : 423.

ARTHUR N. LEEDS.

Arthur N. Leeds, born in Philadelphia, October 14, 1870; educated at Westtown School and Haverford College, graduating B. S. in 1889, and M. A., 1890; Treasurer of the Philadelphia Botanical Club, member of the Academy of Natural Sciences.

JESSE M. GREENMAN.

Jesse M. Greenman, a graduate of the University of Pennsylvania, in the Natural History course, was identified with the Biological School of the University (1889–1893), as one of the instructors of botany, taking charge also of its greenhouse, until he was called to Harvard University in 1894. As Assistant in the Gray Herbarium, connected with the Cambridge Botanical Garden, he has separately and in conjunction with Dr. B. L. Robinson, the Curator, published numerous papers describing new plants, mainly Mexican, which have appeared serially in the *Proceedings of the American Academy of Arts and Sciences* from 1894 to the present.

GENERAL LIST OF BOTANISTS.

The names of persons in the following list comprise many of botanical importance; but, for lack of information concerning them, or because, upon application, a biographical account was not forthcoming, they have been incorporated in a General List, and have been excluded from the descriptive portion of this book. Many of the persons so listed are worthy, from their contributions to botanical science, of more extended notice, but, for the reasons stated above, it was found impossible to include a biographical sketch of them:

ADLUM, MAJOR JOHN.* A horticulturist of note, who wrote two books upon the grape, the first edition being the first American grape book. *Florists' Exchange*, March 30, 1895, contains a note of his horticultural work by Professor L. H. Bailey. See also Bailey, "The Evolution of Our Native Fruits," frontispiece and pp. 50 and 59 (1898).

ALLAM, G. EDWARD. Bethlehem, Pa.

ALLEN, AUGUSTA A. Germantown, Pa.

ALLEN, MRS. JULIETTE B. Camden, N. J.

ARTHUR, PROF. J. C., of Purdue University, Lafayette, Ind., and Botanist to the Indiana Agricultural Experiment Station; was for over a year a resident of Philadelphia. (Physiology.)

ASHMEAD, SAMUEL.* (Algæ.)

BARBECK, WILLIAM.* (Cryptogams.)

BARNARD, JOSEPH M.*

* Deceased.

Barnard, Vincent.*

Bassett, Wm. J. Hammonton, N. J.

Beal, Dr. George N.

Beaver, Dr. Daniel B. D. Reading, Pa.

Bell, John. A botanist, gardener, and lover of plants, of Haddington, Philadelphia.

Bitner, Henry F. Millersville State Normal School, Lancaster County, Pa.

Blair, Dr. T. S. Harrisburg, Pa.

Bohn, I. G. Lickdale, Lebanon County, Pa.

Bolton, Dr. B. Meade. Chief of Bacteriological Department, City of Philadelphia.

Boyer, Howard N. Reading, Pa.

Bradford, James G. Reading, Pa. (Cryptogams.)

Brasier, A. J.* Philadelphia.

Bridges, Dr. Robert.* Philadelphia.

Brinckle, William D.* An experimenter with the raspberry, Philadelphia, 1820-1863. See Bailey, "The Evolution of Our Native Fruits," p. 282.

Bromfield, E. T., D. D. Philadelphia.

Browne, Peter A.*

Buckley, S. B.* Philadelphia.

Bunting, Dr. Martha. Special student in biology, University of Pennsylvania; graduate student in Bryn Mawr College, where she obtained her Ph. D; teacher in Woman's College, Baltimore, and Philadelphia Girls' High School; author of "The Structure of the Cork Tissues in Roots of Some Rosaceous Genera," *Contributions from Botanical Laboratory, University of Pennsylvania*, II: 54, with plate.

* Deceased.

Bussier, Miss K. Germantown, Philadelphia.

Chambers, Miss Sara D. Assisted in botany at the University of Pennsylvania, Philadelphia.

Cochrane, Professor. West Chester, Pa.

Collins, Zaccheus.* Vice-President American Philosophical Society and member of the Academy of Natural Sciences, where he did good work on the herbarium. Born 1764, died June 12, 1831, aged 67.

Colson, Miss Jessie. Prominently identified with the interests of the Woodstown Natural History Club, and a trained botanist, having studied at Swarthmore College and the Biological School of the University of Pennsylvania, where she was Assistant for one year.

Conard, Henry S. A teacher in the Westtown School and Fellow in Biology, University of Pennsylvania. Author of a paper on Painter's Arboretum.

Correa, Abbe.* In 1815 he published, for the use of his classes in Philadelphia, a reduction of the genera in Muhlenberg's Catalogue, according to the natural families of plants of Jussieu. This was appended to the second edition of the catalogue, issued in 1818 by Solomon Conrad, and was probably the earliest attempt in the United States to group our plants by the natural method. See page 154 of this book.

Cressman, Newton F. Pelham, Germantown.

Cressman, Philip.*

Cross, Dr. Laura B. Student and graduate of the Department of Biology, University of Pennsylvania.

Davis, Nelson F. Lewisburg, Pa.

* Deceased.

DeHart, William. A contemporary of William Bartram, the owner of a garden at Fifty-fifth and Woodland Avenue, where grow many rare plants, such as *Gordonia pubescens, Dirca palustris, Pyrus coronaria.*

Dick, John. Nurseryman and florist. Was born in 1818, and died December 29, 1898.

Drown, Edward. Florist and botanist, Weldon, Pa.

Esrey, Dr.*

Febiger, Christian,* of Wilmington, Del. A diatomist who labored incessantly for twenty years, amassing a collection which is now in possession of the Microscopical Section of the Academy of Natural Sciences.

Fetterolf, Dr. Daniel W. Philadelphia.

Fox, Henry. Student in the Department of Biology, University of Pennsylvania.

Garrigues, S. S.* Philadelphia.

Goddard, Dr. Paul B.* Philadelphia.

Green, Dr. Edgar M. Easton, Pa.

Griffith, R. E.*

Gross, Christian. Landisville, Atlantic County, N. J.

Hacker, William. Philadelphia.

Haines, William S.* A lawyer of note, resident in West Chester. Was well known for his devotion to scientific pursuits, having added many interesting species to the mycologic flora of Chester County. He died February 22, 1884, in West Chester, Pa.

Harvey, Professor F. L., of Orono, Maine, formerly a resident of Philadelphia.

* Deceased.

HARRIS, ROBERT C., M. D.* Studied the evolution and variation in our cultivated plants by experimental culture. He was especially interested in the cucurbits, having raised nearly all sorts.

HARVEY, MISS MARGARET B. Bryn Mawr, Pa.

HEUBENER, DR.,* of Bethlehem, Pa., who published "Catalogue of the Plants of Northampton County" in *Silliman's Journal.*

HILGARD, DR. T. G.

HIMES, WM., JR. Bonview, Lancaster County, Pa.

HOLMES, MISS MARY E. Philadelphia.

HOLT, DR. J. F. Professor of the Natural Sciences in the Philadelphia High School.

HUBNER, REV. MR.* A contemporary of Humphry Marshall, mentioned in Darlington's "Memorials of Bartram and Marshall" (page 572).

HUNT, DR. EMILY G. Philadelphia. A very entertaining lecturer on plants.

JACKSON, JOHN, and his son,*

JACKSON, WILLIAM.* Were friends and neighbors of Humphry Marshall in the year 1777. They commenced a highly interesting collection of plants at their home in Londongrove, which, in 1849, was still in good condition.

KAMPMAN, DR.* A contemporary of Humphry Marshall.

KENDERDINE, ROBERT S.* Philadelphia.

KERCHER, DR. D. E. Philadelphia. (Myxomycetes.)

KITCHEL, H. S. Bethlehem, Pa.

KNIGHT, D. ALLEN. Philadelphia.

KRAMSH, REV. SAMUEL.* A contemporary of Humphry Marshall, with whom he corresponded.

* Deceased.

Laubach, S. H. Riegelsville, Bucks County, Pa.

Le Boutillier, Roberts. An orchid connoisseur, Germantown, Philadelphia.

Legaux, Peter.* A vine grower at Spring Mills, Pa., about 1800. See Bailey, "The Evolution of Our Native Fruits," pp. 19, 25, 42.

Leidy, Dr. Joseph.* A distinguished biologist. His herbarium is in the possession of the University of Pennsylvania.

Lewis, May.

Lewis, Dr. F. W. A diatomist and microscopist.

Lewton, Frederick L. One of the curators at the Philadelphia Commercial Museums, familiar with the local flora and author of a paper on "The Classification of Gums and Resins"—*American Journal of Pharmacy*, 1899.

Lochman, Charles L. A photographer of flowers and plants, Bethlehem, Pa.

Mack, I. Lathrop. Hammonton, N. J.

Maclure, William.† A member of the Academy of Natural Sciences, and its president for more than twenty years; was a successful London merchant. He resided for many years in Philadelphia. He made a geological survey of the United States, a description of which was published in 1809. After him was named the osage orange, *Maclura aurantiaca.*

Maison, Robert S., M. D., of Chester, Pa.

March, Benjamin S.

Matos, Louis J. Philadelphia Commercial Museums.

* Deceased.

† *The Gardeners' Monthly* (Meehan), II, p. 360. See for more extended biography, *Appleton's Cyclopedia of American Biography.*

MEEHAN, JOSEPH. A horticulturist and botanist (brother of Thomas). Germantown.

MILNER, NATHAN.*

MILLER, DR. MORRIS B. Media, Pa.

M'MINN, JOHN.*

MCKENNEY, RANDOLPH E. B. Student in the Department of Biology, University of Pennsylvania, where he took the degrees of B. S. and M. S. Author of "Observations on the Development of Some Embryo-sacs," *Contributions from Botanical Laboratory, University of Pennsylvania*, II: 80, with plate.

NIEDERLEIN, GUSTAVO. A German botanist from South America; Chief of the Scientific Department of the Commercial Museums. He has traveled extensively in South America, Europe, and the far East, and is the author of a number of valuable botanical papers in German, Spanish and English.

NULL, AMOS B. Bonview, Lancaster County, Pa.

OMENSETTER, JOHN K.

OTIS, MISS LOIS M. Assistant in Botany, Girls' High School, Philadelphia.

PEIRCE, JOSHUA,* and

PEIRCE, SAMUEL,* of East Marlborough, Chester County, Pa., in 1800 began to adorn their premises by tasteful culture and planting until they produced an arboretum of considerable interest and importance. The trees planted by them were many of them still standing in 1896, when the place was visited by the writer, in company with Dr. W. T. Sharpless, of West Chester. A large and fine tree, in full flower, of *Magnolia macrophylla*, was especially noted.

* Deceased.

Pennington, Dr. Mary Engle. A careful chemico-physiological worker, late Fellow in Botany, University of Pennsylvania, and author of a valuable paper in the *Botanical Contributions of the University of Pennsylvania*, I: 203, entitled, "A Chemico-Physiological Study of Spirogyra nitida."

Pennock, Edward. Dealer in botanical and medical supplies, Philadelphia.

Peters, Rev. John E. A botanist and collector of considerable insight, located as pastor successively at May's Landing, Pleasantville and Camden, N. J.

Porter, Dr. Hobart C. Graduate of Princeton in 1881; received the degree of B. L. from the University of Pennsylvania in 1884, and Ph. D. from the University of Rostock, Germany in 1894; Instructor in Botany, University of Pennsylvania, and translator of "A Text-Book of Botany," by Strasburger, Noll, Schenck, and Schimper, 1898. Dr. Porter has specialized on the algæ and the vascular cryptogams, having, as Lecturer in the Department of Philosophy and Department for Teachers, given extended laboratory courses on the same.

Potts, Charles.

Price, Ferris W. Swarthmore College, Pa.

Pugh, Evan.* Mentioned as a collector of plants in the "Flora Cestrica."

Putnam, Miss Bessie L. Harmonsburg, Pa.

Pyle, Miss Gheretien G. Wilmington, Del.

Rand, Theodore.

Rau, Eugene A., of Bethlehem, Pa. A student of mosses and fungi.

* Deceased.

Ravenel, Dr. Mazyck P. Bacteriologist to State Live Stock and Sanitary Board, and Instructor in Bacteriology, University of Pennsylvania. Dr. Ravenel has published extensively on bacteriological subjects.

Read, James.

Remington, Professor J. P. Philadelphia College of Pharmacy.

Richter, Walter H. Ashbourne, Pa.

Rorer, Mrs. S. T. Interested in fungi as a valuable food supply. Philadelphia.

Rothrock, Dr. Harry. West Chester, Pa.

Ruschenberger, Dr. W. S. W.* A distinguished Philadelphia scientist, who, in the early days of his career in 1831 and 1833, published, in *Silliman's Journal*, a translation of a paper by Dr. C. P. Bertero, entitled, "A List of the Plants of Chili." Later, he published "Elements of Natural History," embracing zoology, botany and geology (two volumes, 1850).

Rushmore, Dr. Edward. Plainfield, N. J.

Ruth, Dr. Harry F. Lehnenberg, Bucks County, Pa.

Rutter, A. C. Sellersville, Pa.

Saunders, C. F. Philadelphia, Pa. A popular contributor to the botanical and horticultural press.

Sayers, Mrs. Edwin S. Philadelphia.

Schively, Dr. Mary. Philadelphia.

Schively, Dr. Adeline F. Received from the University of Pennsylvania, in 1892, a certificate in biology, and in 1897 the degree of Ph. D. from the same institution. She was made Honorary Fellow in

* Deceased.

Botany in 1897, which Fellowship she still holds. Dr. Schively, as Assistant in the Department of Biology, Girls' Normal School, has done much to stimulate an interest in botany among her students. She is the author of several botanical papers, viz.: "Contributions to the Life History of Amphicarpæa monoica," *Contributions Botanical Laboratory, University of Pennsylvania*, I: 270 and II: 20.

SCHMUCKER, DR. SAMUEL CHRISTIAN. A graduate of Muhlenberg College in 1882, with the degree of A. B. From the same institution, in 1884, he received the degree of S. B.; 1885, A. M.; S. M., 1891. He is Professor of Biology in the West Chester State Normal School, and Honorary Fellow in Botany, University of Pennsylvania, 1897, to date.

SENSENIG, DAVID M. West Chester, Pa.

SHAFER, JOHN A., Ph. G. Carnot, Pa.

SHAW, C. H. Graduate Student Department of Biology, University of Pennsylvania, and Teacher of Biology in Temple College, Philadelphia.

SHULZE, JOHN A. Philadelphia. (Diatoms.)

SIMMONS, JOHN.

SIMONS, MISS ELIZABETH A. Assistant in Botany, Girls' High School, Philadelphia. Author of "Comparative Studies on the Rate of Circumnutation of Some Flowering Plants," *Contributions from Botanical Laboratory, University of Pennsylvania*, II: 66.

SMITH, BENJAMIN H. A botanist of repute, actively engaged in the scientific work of the Academy of Natural Sciences. He has one of the finest private herbariums in the city.

Smith, Miss Amelia C. Student in the Department of Biology, University of Pennsylvania. Author of a paper on "*Aphyllon uniflorum.*"

Snyder, Jacob.*

Stauffer, Jacob.* Lancaster, Pa.

Stenz, Charles F. Natrona, Pa.

Stokes, A. S.

Stowell, Willard A. Trenton, N. J.

Sutton, Harry I. Philadelphia.

Thompson, Miss Caroline B. Student in the Department of Biology, University of Pennsylvania, and author of a paper on "The Structure and Development of Internal Phloem in Gelsemium sempervirens, Ait," *Contributions from Botanical Laboratory, University of Pennsylvania,* II: 41, with plate.

Trimble, William. A botanist familiar with the plants of Philadelphia and vicinity.

Trimble, Dr. Samuel. Lima, Delaware County, Pa.

Troth, Henry. A noted photographer of plants and flowers. Philadelphia.

Van Vleck, Rev. Jacob. A contemporary of Humphry Marshall.

Walmsley, W. H. A diatomist, micro-photographer and noted optician.

Watters, Prof. Leon H. Media, Pa. A microscopist of some note.

Weaver, Gerritt E. H. Philadelphia.

Williams, Miss, New Hope, Pa. A maker of excellent water-color sketches of wild flowers.

* Deceased.

Wilson, Dr. Lucy Langdon Williams. Teacher of the Natural Sciences in the Philadelphia Girls' Normal School; graduate (Ph.D.) University of Pennsylvania, and author of several books and papers on science subjects. A recent paper is noteworthy: "Observations on Conopholis Americana," *Contributions from Botanical Laboratory, University of Pennsylvania*, II: 3, with six plates.

Wister, Caspar.*

Wistar, Caspar, Jr.*

Wolle, Jacob,* of Bethlehem, Pa., was born at Bethany, on the Island of St. John, West Indies, August, 1788, and died at Bethlehem, April, 1863. He was for a number of years Justice of the Peace, and had a fine collection of plants.

Zantzinger, Wm. S.

Zell, Mrs. Lydia Dieler. Librarian Linnæan Society, Lancaster, Pa.

* Deceased.

APPENDICES.

APPENDIX I.

Members of the Philadelphia Botanical Club,

who are actively collecting and herborizing.

Corrected to November 26, 1895.

Biddle, Charles J.,	Philadelphia.
Bassett, Frank L.,	Hammonton, N. J.
Brown, Stewardson,	Germantown.
Brown, Dr. A. P.,	Germantown.
Carson, Dr. Elwood M.,	Norristown, Pa.
Cheney, Jesse S.,	Philadelphia.
Day, Richard H.,	Germantown.
Day, Frank Miles,	Philadelphia.
Evans, Dr. William,	Philadelphia.
Holmes, Jesse H.,	Newtown, Pa.
Jahn, Albrecht,	Philadelphia.
Kerniski, Professor J. B.,	Lancaster, Pa.
Kirk, Elwood J.,	Philadelphia.
Krout, Professor A. F. K.,	Philadelphia.
Kimball, C. W.,	Haddonfield, N. J.
Kite, Nathan,	Philadelphia.
Longstreth, M. R.,	Philadelphia.
Lippincott, Charles D.,	Swedesboro, N. J.
Lightfoot, Dr. Thomas M.,	Germantown.
Loessle, Henry A.,	Philadelphia.

Moms, J. Bernard,	Yeadon, Pa.
Moerck, Frank X.,	Philadelphia.
Moyer, Dr. J. S.,	Quakertown, Pa.
Oberholtzer, John E.,	Norristown, Pa.
Pennypacker, J. T.,	Wilmington, Del.
Reed, Dr. W. H.,	Norristown, Pa.
Saurman, B. F.,	Philadelphia.
Schneider, Louis,	Philadelphia.
Spencely, Cornelius,	Philadelphia.
Serrill, Wm. J.,	Philadelphia.
Stone, Hugh E.,	Coatesville, Pa.
Stone, Witmer,	Germantown, Pa.
Stiles, Harry,	Haddonfield, N. J.
Stahr, President J. S.,	Lancaster, Pa.
Saunders, C. F.,	Philadelphia.
Turner, Alexander,	Philadelphia.
Thomas, Dr. Joseph,	Quakertown, Pa.
Woodbury, Dr. Frank,	Philadelphia.

APPENDIX II.

Members of the Botanical Society of Pennsylvania, 1897-1899.

Abbott, Miss E. O.,	Philadelphia.
Abernethy, Miss E. G.,	Philadelphia.
Ashmore, Miss L. J.,	Philadelphia.
Bancroft, Miss Margaret,	Haddonfield, N. J.
Barr, Miss E.,	Wayne, Delaware Co., Pa.
Barker, Miss D.,	Philadelphia.
Belden, Miss J. C.,	Philadelphia.

Bengard, Miss L. E.,	Moorestown, N. J.
Berry, Miss,	Philadelphia.
Boyer, Professor Charles S.,	Philadelphia.
Brock, Robert C. H.,	Philadelphia.
Brock, Mrs. C. H.,	Philadelphia.
Brown, Miss,	Philadelphia.
Bunting, Dr. Martha,	Philadelphia.
Banes, R. C.	Philadelphia.
Barclay, F. W.,	Haverford, Pa.
Brock, John W.,	Philadelphia.
Bancroft, Miss Margaret,	Haddonfield, N. J.
Clark, Miss Edith,	Philadelphia.
Claye, Miss C. B. F.,	Moorestown, N. J.
Cliff, Miss Etta,	Philadelphia.
Coles, Mrs. J. W.,	Philadelphia.
Coles, Miss,	Philadelphia.
Conard, Henry S.,	Westtown Academy, Pa.
Cornman, Mrs. Mary,	Philadelphia.
Crowell, Miss H. W.,	Philadelphia.
Crowell, Miss M. C.,	Philadelphia.
Croft, Samuel,	Philadelphia.
Craig, Dr. W. F.,	Philadelphia.
Curtis, Miss,	Philadelphia.
Colfelt, Mrs. R.,	Philadelphia.
Carr, Mrs. Cassandra,	Philadelphia.
Dougherty, T. Harvey,	Philadelphia.
Dissel, Charles,	Philadelphia.
Ehinger, Professor C. E.,	West Chester, Pa.
Fox, Mrs. L. R.,	Philadelphia.
Free, Dr. G. B. M.,	Williamson School, Pa.
Findlay, William,	Philadelphia.

Gendell, Miss Lucy,	Philadelphia.
Gardiner, Miss Ella J.,	Philadelphia.
Garretson, Miss Marian,	Philadelphia.
Gibson, Miss Mary,	Philadelphia.
Gilbert, Miss,	Philadelphia.
Harrison, Provost C. C.,	Philadelphia.
Harrison, Mrs. C. C.,	Philadelphia.
Haigh, Mrs. M. B.,	Philadelphia.
Hall, Annie B.,	Philadelphia.
Hallowell, Mrs. Sarah P. F.,	Philadelphia.
Harshberger, Dr. J. W.,	Philadelphia.
Heston, Mrs.,	Newtown, Bucks County, Pa.
Head, Miss Harriet,	Philadelphia.
Homer, Mathias,	Lansdowne, Pa.
Hodgson, Miss E.,	Philadelphia.
Houston, S. F.,	Philadelphia.
Hunt, Dr. Emily,	Philadelphia.
Henry, Mr. & Mrs. C. W.,	Philadelphia.
Harris, Mrs. W. T.,	Cynwyd, Pa.
Harper, W. W.,	Philadelphia.
Ide, Miss Nellie,	Philadelphia.
James, Miss S.,	Philadelphia.
Jones, Miss Julia F.,	Philadelphia.
Johnston, Mrs. Emory R.,	Lansdowne, Pa.
Kraemer, Professor Henry,	Philadelphia.
Lathrop, Dr. Ruth,	Philadelphia.
Larkin, Mrs. Sophie,	Chester.
Lindsay, Miss,	Philadelphia.
Le Boutillier, Roberts,	Philadelphia.
Longshore, M. Elizabeth,	Cynwyd, Pa.
Lowber, Miss,	Philadelphia.

Ludwig, Miss Florence,	Philadelphia.
Mackenzie, Miss Adele,	Philadelphia.
Macfarlane, Professor J. M.,	Philadelphia.
Manning, Miss Katherine S.,	Philadelphia.
Marshall, Mrs. H. R.,	Philadelphia.
McMichael, C. Emory,	Philadelphia.
Michener, Professor,	Philadelphia.
Miller, Dr. Adolph W.,	Philadelphia.
Morton, Charles,	Philadelphia.
Morwitz, Joseph,	Philadelphia.
Myers, Miss Jane V.,	Cynwyd, Mont. Co., Pa.
Marot, Philip,	Philadelphia.
Manning, Katherine S.,	Philadelphia.
Nassau, Mrs. C.,	Philadelphia.
Newlin, Miss Sarah,	Philadelphia.
Nicholson, Miss Katherine,	Philadelphia.
Oliver, General Paul A.,	Forest Roads, Fern Lodge, Oliver's Mills, Pa.
Palmer, T. Chalkley,	Media, Pa.
Pennock, Aldrich,	Lansdowne, Pa.
Pendleton, Miss C.,	Philadelphia.
Porter, Dr. H. C.,	Philadelphia.
Peart, Mrs. Mary,	Philadelphia.
Roberts, Miss C. E.,	Bala, Pa.
Roberts, Miss F. A.,	Bala, Pa.
Robertson, Mrs. A. D.,	Ridley Park, Pa.
Robins, Thomas,	Philadelphia.
Rorer, Mrs. S. T.,	Philadelphia.
Rorer, Mr.,	Philadelphia.
Ravenel, Dr. M. P.,	Philadelphia.
Sabold, Miss E. C.,	Philadelphia.
Sayre, Professor,	Philadelphia.

Schmucker, Dr. S. C.,	West Chester, Pa.
Schuyler, Miss,	Lansdowne, Pa.
Shaw, C. S.,	Philadelphia.
Schively, Dr. Adeline F.,	Philadelphia.
Schively, Miss M. S.,	Philadelphia.
Sill, Mrs. Harold,	Philadelphia.
Smith, Miss Ethel,	Philadelphia.
Smith, Miss C. M.,	Philadelphia.
Shallcross, Miss Rebecca,	Philadelphia.
Snowden, Miss Louise,	Philadelphia.
Spear, Mrs. Louise M.,	Wallingford, Pa.
Staley, Miss S.,	Layfayette Hall, Montgomery Co., Pa.
Strawhower, Miss E. F.,	Philadelphia.
Stetson, John P.,	Philadelphia.
Snowden, Mrs. A. Louden,	Philadelphia.
Sell, Mrs. Pauline W.,	Philadelphia.
Townsend, Edgar N.,	Rutledge, Pa.
Trainor, Mrs. Newlin,	Chester, Pa.
Tundle, Miss,	Haddonfield, N. J.
Vansant, Miss Belle,	George School, Bucks Co., Pa.
Walmsley, W. H.,	Philadelphia.
Wetherill, Anna T.,	Philadelphia.
Williams, Dr. Talcott,	Philadelphia.
Watters, Professor Leon,	Media, Pa.
Woodbridge, Mrs.,	Chester, Pa.
Williams, Mrs. Mary,	Philadelphia.
Wicks, Mrs. M. B.,	Rutledge, Pa.
Windel, Francis,	West Chester, Pa.
Williams, Thyrza C.,	Haddonfield, N. J.
Yarnall, Miss,	Philadelphia.
Yarnall, Miss,	Yeadon, Delaware Co., Pa.

APPENDIX III.

PHILADELPHIA MOSS CHAPTER.

The Philadelphia Moss Chapter was organized in February, 1899, by those interested in the study of the moss flora of the neighborhood. The following officers were elected: President, Dr. A. F. K. Krout; Recording Secretary and Treasurer, Mr. Alexander McElwee; Corresponding Secretary, Mrs. Josephine B. Lowe. The object of the Chapter is to gather and classify the *Musci hepaticæ* and *Musci frondosi* of the neighborhood, and to gradually make an herbarium of the typical forms found in the vicinity of the city.

APPENDIX IV.

AN HISTORICAL ACCOUNT

of the

Scientific Journals and Serial Publications

Issued from Philadelphia.

(Containing articles on botany, and from related departments of science.)

---

1. Early Proceedings of the American Philosophical Society for the Promotion of Useful Knowledge, compiled by one of the secretaries. From the Manuscript Minutes of the Meetings from 1744 to 1838. Philadelphia, 1884, pp. iii, 1875, with index.

2. Proceedings of the American Philosophical Society, held at Philadelphia, for Promoting Useful Knowledge. Volume I, octavo, for the years 1838, 1839 and 1840. This publication has been continued to date.

3. Transactions of the American Philosophical Society, held at Philadelphia, for Promoting Useful Knowledge. Volume I, from January 1, 1769, to January 1, 1771; Philadelphia, 1771, large octavo. Second edition corrected 1789, runs until Volume VI, 1809, the size of the page gradually increasing. Volume I, new series, Philadelphia, 1818, runs to Vol. XVI, 1890.

4. Journal of the Academy of Natural Sciences of Philadelphia. Volume I, Part 1, 1817. Part 2, 1818, running to Vol. VIII, Part 1, 1839, and Part 2, 1842, when it was enlarged to quarto. Volume I, second series, 1847-1850, running to the last number issued, Volume XI, Part 2, 1899.

5. Proceedings of the Academy of Natural Sciences of Philadelphia. Volume 1, 1841, 1842, 1843, octavo; printed in 1843, running to present year.

6. The Franklin Journal and American Mechanics' Magazine, devoted to the Useful Arts, Internal Improvements and General Science, under the Patronage of the Franklin Institute of the State of Pennsylvania. Volume I, Philadelphia, 1826, octavo running to Volume IV, 1827, when it was named: Journal of the Franklin Institute of the State of Pennsylvania, devoted to the Mechanic Arts, Manufactures, General Science, and the recording of American and other Patented Inventions. Volume I, new series, 1828, ran to Volume XXVI, 1840, when the third series was begun, running to date (74th year). In Volume XVII, 1836, the title was again changed to read: Journal of the Franklin Institute of the State of Pennsylvania and Mechanics' Register, devoted to Mechanical and Physical Science, Civil Engineering, the Arts and Manufactures, and the recording of American and other Patented Inventions. The title was

changed at Volume XLII (third series), 1861, to read: Journal of the Franklin Institute of the State of Pennsylvania, for the Promotion of the Mechanic Arts, devoted to Mechanical and Physical Science, Civil Engineering, the Arts and Manufactures. At Volume LIV (third series), 1867, the present title was adopted: The Journal of the Franklin Institute, devoted to Science and the Mechanic Arts.

7. Journal of the Philadelphia College of Pharmacy. Volume I, octavo, Philadelphia, 1830, ran to Volume VI, when it became the American Journal of Pharmacy. Volume I, new series, running to Volume XVIII, 1852, when it became third series. Volume I, 1853, running to Volume XLII, 1870, when the fourth series was started. Volume I, 1871, running to date, 1899, the last volume being No. 71, of all the series.

8. Also under the auspices of the College of Pharmacy, the Alumni Report, published by the Alumni Association, beginning with Volume I, 1864.

9. Proceedings of the American Pharmaceutical Association, published in Philadelphia from 1852 to date, Volume XLVI, 1898.

10. The Gardeners' Monthly and Horticultural Advertiser, devoted to Horticulture, Arboriculture, Botany and Rural Affairs. Edited by Thomas Meehan. Volume I, 1859. The title was changed to read (Volume XVI, 1874), The Gardeners' Monthly and Horticultural Advertiser, devoted to Horticulture, Arboriculture, and Rural Affairs, running to Volume XXIX, 1887, and one number, Volume XXX, January, 1888, when it ceased. Later, under the editorial supervision of Thomas Meehan & Sons, a new journal was started under the name: Meehan's Monthly. A Magazine

of Horticulture, Botany and Kindred Subjects. Volumes I and II, 1891-1892, running to date.

11. The American Naturalist. Volume I, published at Salem, Mass., 1868 (octavo), until Volume XX, 1876, when it was printed at Boston, until Volume XII, 1878, when the publication was transferred to Philadelphia, where it still continues to be printed.

12. Transactions of the Wagner Free Institute of Science of Philadelphia. Quarto, Volume I, May, 1887. Volume II, December, 1889. Volume III, Part I, August, 1890. Part 2, December, 1892. Part 3, March, 1895. Part 4, April, 1898. Volume IV, January, 1896, begun. Volume V, January, 1898, begun.

13. Forest Leaves, started July, 1886, has run to Volume VII, No. 4, August, 1899. Published bi-monthly by the Pennsylvania Forestry Association.

14. Contributions from the Botanical Laboratory of the University of Pennsylvania. A serial publication, begun in 1892, and devoted to botanical articles by the professors, instructors and students of the School of Biology. The first two numbers of Volume I were published under similar cover, and the title of the plates were similarly printed (Bot. Cont. Univ. Penna.), but No. 3, Volume I, 1897, was published for the University of Pennsylvania, with the authorization of the Committee on Publication. The covers now conform with Publications of the University of Pennsylvania (new series). As set forth in the classification, the Contributions from the Botanical Laboratory belong to *Group II, Serial Publications, Series in Botany.* The articles that have so far appeared are as follows: *

* The headings of the plates in Volume I, No. 3, and Volume II, No. 1, were changed, the numbers being unbracketed, as in the two previous numbers, and the title reading "Bot. Contrib. Univ. Penna."

Volume I—No. 1.

(Plates I-XIII.)

1. "A Monstrous Specimen of Rudbeckia hirta, L." By J. T. Rothrock, B. S., M. D.

2. "Contributions to the History of Dionæa Muscipula, Ellis." By J. M. Macfarlane, D. Sc.

3. "An Abnormal Development of the Inflorescence of Dionæa." By John W. Harshberger, A. B., B. S.

4. "Mangrove Tannin." By H. Trimble, Ph. M.

5. "Observations on Epigæa repens, L." By W. P. Wilson, D. Sc.

6. "A Nascent Variety of Brunella vulgaris, L." By J. T. Rothrock, B. S., M. D.

7. "Preliminary Observations on the Movements of the Leaves of Melilotus alba, L., and other plants. By W. P. Wilson, Sc. D. and J. M. Greenman.

Volume I—No. 2.

(Plates XIV-XVII.)

8. "Maize: A Botanical and Economic Study." By John W. Harshberger, Ph. D.

Volume I—No. 3.

(Plates XVIII-XXXVI.)

9. "A Chemico-Physiological Study of Spirogyra nitida" By Mary E. Pennington, Ph. D.

10. "On the Structure and Pollination of the Flowers of Eupatorium ageratoides and E. coelestinum. By Laura B. Cross, Ph. D.

11. "Contributions to the Life-History of Amphicarpæa monoica." By Adeline F. Schively, Ph. D.

Volume II—No. 1.

(Plates I-XII.)

1. "Observations on Conopholis Americana." By Lucy L. W. Wilson, Ph. D., Head of the Biological Department, Philadelphia Normal School for Girls. (With plates i-vi.)

2. "Recent Observations on Amphicarpæa Monoica." By Adeline F. Schively, Ph. D., Honorary Fellow in Botany.

3. "Water Storage and Conduction in Senecio præcox, D. C., from Mexico." By John W. Harshberger, Ph. D., Instructor in Botany. (With plates vii-viii.)

4. "Structure and Development of Internal Phloem in Gelsemium sempervirens, Ait. By Caroline B. Thompson, B. S. (With plate ix.)

5. "Structure of the Cork Tissues in Roots of some Rosaceous Genera." By Martha Bunting, Ph. D. (With plate x.)

6. "Comparative Studies on the Rate of Circumnutation of some Flowering Plants." By Elizabeth A. Simons.

7. "Observations on the Development of some Embryo-sacs." By Randolph E. B. McKenney, B. S. (With plate xi.)

8. "Observations on some Hybrids between Drosera filiformis and D. intermedia." By John M. Macfarlane, D. Sc., Professor of Botany. (With plate xii).

9. "Statistical Information Concerning the Production of Fruits and Seeds in Certain Plants." By John W. Harshberger, Ph. D., Instructor in Botany.

15. The Forester, an Illustrated Bi-monthly Pamphlet, devoted to the Development of our Forests. Official Organ of the South Jersey Woodmen's Association, begun at May's Landing, N. J., January, 1895, by John Gifford; later published at Camden, N. J. Later it became The Forester. An Illustrated Journal devoted to Forestry, Volume I, No. 4. The size of the page and the title were changed with Volume III, No. 3, March, 1897: The Forester, an Illustrated Monthly Journal of Forestry, devoted to the Conservation of Forests, the Proper Utilization of Forest Products, the Forestation of Waste Lands, and the Preservation of Game. Published at Camden; John Gifford, editor and publisher, Princeton, N. J. With Volume IV, the cover and the title were again changed to read: The Forester, a monthly magazine, devoted to the care and use of forests and forest trees, and related subjects. Published monthly by the

American Forestry Association, at Washington, D. C., running to June, 1899, Volume V, No. 6.

16. Transactions and Proceedings of the Botanical Society of Pennsylvania. Session 1897-1898, published 1899. This publication, Volume I, No. 1, 1898, is a reprint of Volume II, No. 1, Contributions from the Botanical Laboratory of the University of Pennsylvania, and contains pages 111-123, inclusive, the Proceedings of the Botanical Society of Pennsylvania, for Session 1897-1898.

17. Philadelphia Mycological Center Bulletin. This publication is issued by those interested in the fleshy fungi, especially the edible kinds. The author has seen only two Bulletins and the preliminary announcements.

18. Monographs of the Philadelphia Commercial Museums. Three of these have been issued as follows:

"The Republic of Guatemala." By Gustav Neiderlein, Philadelphia, 1898.

"The State of Nicaragua of the Greater Republic of Central America." By Gustav Neiderlein.

"The Republic of Costa Rica." By Gustav Neiderlein.

19. In connection with the Philadelphia Commercial Museums, and under the auspices of that institution and the Franklin Institute, the following publication is issued: Bulletin of the National Export Exposition, Volume I, Number 1, which appeared May 18, 1899, running to date. The cover gives a portrait of those prominently identified with the movement, and numerous illustrations give an adequate conception to the reader of the buildings under construction, of the plans and the architectural appearance of the Exposition buildings when finally completed.

APPENDIX V.

HORTICULTURAL HALL,

Fairmount Park.

A history of the botanists of Philadelphia would not be complete without an account of the horticultural building erected in Fairmount Park for the Centennial Exposition of 1876. Without doubt, the horticultural, botanical, forestal and floral exhibits at the Philadelphia Centennial Exposition stimulated the scientific interests of the country and also the horticultural, lumber and florist industries established in the United States. The horticultural building erected then, still stands, and is, in itself, a great botanical institution, supported by the City of Philadelphia. A sketch of the structure, written for the "Historical Register of the Centennial Exposition,* will give a better idea of its arrangement and size.

"It is located on the Lansdowne Terrace, a short distance north of the Art Gallery, and has, like the latter, a commanding view of the Schuylkill River, and a portion of the city. The design is in the Mauresque style of architecture of the twelfth century, the principal materials, externally, being iron and glass. The length is 383 feet, the width, 193 feet, and the height to the top of the lantern seventy-two feet.†

"The main floor is occupied by the central conservatory, 230 x 80 feet, and fifty-five feet high, surmounted by the lantern, 170 feet long, twenty feet wide, and fourteen feet

* 1876. *Frank Leslie's Historical Register of the United States Centennial Expedition, 1876.* Edited by Frank H. Morton, New York, 1877, folio pp. 324.

† A number of years ago this lantern was removed, and the entire roof arched over with glass lights for the better growth of the plants.

high. Running entirely around this conservatory, at a height of twenty feet, is a gallery five feet in width. On the north and south sides are four forcing-houses. Each house is 100 x 30 feet, and covered with a curved roof of iron and glass. From the vestibules, at the centre of the east and west ends, ornamental stairways lead to the internal galleries of the conservatory, as well as to the four external galleries, each 100 x 80 feet, which surmount the roofs of the forcing-houses. These external galleries are connected by a fine promenade, formed by the roofs of the rooms on the ground floor, and having a superficial area of 1800 square yards. The east and west entrances are reached by flights of blue marble steps, from terraces 80 x 20 feet. This building cost $251,937." At the four corners of this building were situated, in 1876, four large rooms. The two eastern rooms have been converted into a temperate house by the removal of the outer wood-work and the substitution of glass. Of the two western rooms, one is used as an office, the other as a museum, which is never opened to the public. On the terrace to the north is found the lily-pond; to the south a range of greenhouses and propagating frames, and to the west the celebrated sunken garden. The main propagating greenhouses and frames are removed from the hall a considerable distance toward the north-east. According to the "Official Catalogue,"* the architect of this building was H. J. Schwarzman; the contractor, John Rice, of Philadelphia; the wrought iron being furnished by the Keystone Bridge Company, Pittsburg, Pennsylvania; the cast iron by Samuel J. Cresswell,

* *International Exhibition, 1876, Official Catalogue, Complete in One Volume.* Philadelphia, 1876.

Philadelphia; the painting was done by Joseph Chapman, Philadelphia, and the masonry, by Moore & Scattergood.*

Surrounding the horticultural building is an extensive arboretum of many noteworthy trees. *Gordonia pubescens* is one of the rarest and most interesting specimens found here. Many of the old forest trees still remain to give vigor to the landscape. Japanese cut-leaved maples, oriental plants and exotic shrubs, make the place an attractive and profitable one for the botanist to visit. The ornamental grass bed, the cactus beds, the flower borders and lily tank, display a large series of interesting plant forms. The lotus pond, along the principal driveway, and the rhododendron thickets, add to the landscape effects produced by judicious planting. †

APPENDIX VI.

A Short Sketch of Philadelphia Trees

noted for their

Historical or Botanical Interest.

The North Brook Chestnut Tree. This tree at North Brook, Chester County, Pennsylvania, is on the property of Mr. Abraham Marshall (*Forest Leaves*, II, p. 35, with illustration). At three feet above the ground it was twenty-five feet and two inches in girth when measured on January 1, 1889.

* See for account of Centennial Conservatory *The Gardeners' Monthly* (Meehan's) XVII, p. 93 (1875).

† See page 33.

Original Penn Treaty Elm. On the Delaware River, at Shackamaxon Street. It measured twenty-four feet around the base, and one branch extending toward the Delaware River was 150 feet long. It blew down in March 3, 1810, and by count its age was found to be 283 years.

Pennsylvania Hospital's Descendant of the Penn Treaty Elm. This tree is found on the grounds of the Hospital. The minutes of the Hospital, dated 3 mo. 26, 1810, state that "A scion from the root of a tree called the Great Elm of Kensington, said to have been the same tree under which William Penn, the proprietor of Pennsylvania, held the first treaty with the Indians, was presented by Matthew Vanduzen, and planted by Peter Brown, Esq., near the centre of the western-most lot belonging to the Hospital, for which Peter Brown is requested to return to Matthew Vanduzen the thanks of the managers and to procure a box to defend it from injury. The parent tree was blown down in a late storm."

General Oliver's Descendant of the Treaty Elm. A shoot from the roots of the old tree which blew down in 1810 was carried to and planted on the Oliver estate, at Bay Ridge, New York, where it grew for more than fifty years, until it was dug up and removed to Oliver's Mills, on the mountains near Wilkes-Barre, Pennsylvania (*Forest Leaves*, III, pp. 124 and 149, with illustrations).*

The University of Pennsylvania's Descendant. A shoot from the Oliver tree at Wilkes-Barre was obtained and planted in front of the main college building of the University, on Arbor Day, April 10, 1896.

* Two other descendants are known—one in Cooper Square, Camden; one in the yard of the Friends' Meeting on Twelfth Street. See an interesting article by Ethel Austin Shrigley, of Lansdowne (*Forest Leaves*, VII, p. 42).

The Dundas Elm. The finest tree in the City of Philadelphia, at Broad and Walnut Streets, which is variously estimated from 150 to 400 years of age. It was once a part of the Vauxhall gardens. On September 8, 1819, when a mob, incensed at the failure of an announced balloon ascension, set fire to the garden, the flames spread to the branches of the tree several times, but were promptly extinguished by the firemen. For an illustration of this tree see *Forest Leaves*, IV, p. 136.

Bartram Cypress. This tree (see ante, page 65) still standing, although dead, is seven feet in diameter, and was planted about 1769. (*Forest Leaves*, V, p. 120, for full-page illustration.)

The Rodman Buttonwood Tree. Standing at a place called Flushing, in Bucks County, Pennsylvania, on the Newportville Road, about one half-mile from Newportville, and about two miles from Croydon Station, Pennsylvania Railroad. Planted about 1745 by William Rodman. The tree measures twenty-nine feet six inches at a point two feet from the ground, and twenty-eight feet, four inches in circumference at a point six feet from the ground. It appears to be in a perfect state of preservation (*Forest Leaves*, VI, p. 12).

Trees in Bartram's Garden. See description of the garden under the biographical sketch of John Bartram, for the Petre Pear Tree, Christ's Thorn, Smyrna Box-wood, Turkey Box-wood, Bartram Oak, Silver Maple, European Cornel (*Cornus mas*), Papaw-tree. Yellow-wood (*Virgilia lutea*); a tree of extremely large size, and perfectly healthy, growing near the Bartram house.

DeHart's Gordonia pubescens. On Woodland Avenue,

opposite to the entrance to Bartram's garden, is a plain brick building, covered with ivy. In the garden of the owner, William DeHart, near the rear end on a plot of ground, sloping to the north, is a fine tree of *Gordonia pubescens*, a descendant of one previously in existence in Bartram's garden. Another descendant is found in Fairmount Park, along the south driveway near the Horticultural Hall, also of good size.

The Michaux Grove. One-half of the money left to the American Philosophical Society, in 1825, by Michaux, the French botanist, was given to the Fairmount Park Association. A grove called the Michaux Grove has been begun in West Park, near Horticultural Hall. It is to consist of two specimens of every oak suited to the climate.

The Woodland Ginkgo Tree. In "Downing's Landscape Gardening" (7th edition, 1865, p. 26), the following occurs: "The attention of the visitor to this place is now arrested by two very large specimens of that curious tree, the Japanese Ginkgo (*Salisburia*), sixty or seventy feet high, perhaps, the finest in Europe or America." It was introduced by William Hamilton, the owner of Woodlands, from England, in 1784. It is a male tree. It is still regarded as one of Philadelphia's arboreal treasures, and tree lovers from distant parts of the globe, when in the city, journey to the cemetery to see the magnificent specimen.

Zelkova crenata. Mr. William Hamilton, who lived at Woodlands, planted many exotics for the first time in America, and his garden was one of the most famous establishments of the kind in America. Among other trees he introduced the Lombardy Poplar and the Norway Maple into this country. Woodlands was long ago converted into

a cemetery, and many of Hamilton's trees have thus been spared. The most conspicuous and interesting of these now are four plants of the Caucasian *Zelkova crenata*, about four feet in diameter, probably the largest specimens of this interesting tree in America. *Zelkova*, which belongs to the Elm family, consists of two species, one of the type of the genus *Zelkova crenata*, being found only in the Caucasus, while the other species, *Zelkova Keaki*, is confined to Japan.*

Blunston Oak. Situated a short distance over the city line in Darby. This tree has served for generations as a landmark for surveyors. It was mentioned in a deed of 1683 as an ancient tree, and yet it is still in a luxuriant condition.

The Original Seckel Pear Tree. The original Seckel Pear Tree was standing (August 31, 1880) in the Twenty-sixth Ward of Philadelphia, near Girard Point, on the farm of John Bastian. It takes its name from Lawrence (Laurence?) Seckel, a former owner, who first introduced it to public notice, upon coming into possession of the farm. A reference to the tree will be found in Watson's "Annals of Philadelphia and Pennsylvania" (Vol. II, p. 487), also *The Gardeners' Monthly*, of February, 1865, and September, 1880, with illustration.

The Robert Morris Sago Palm. This tree, growing in Horticultural Hall, Fairmount Park, was presented to the Centennial Exhibition of 1876. The following label attached to it tells its history: "1776, *Cycas revoluta*, owned by Robert Morris, of Philadelphia, before and during the Revolutionary War, presented by Jacob Hoffner, of Cincinnati, 1876."

* *Garden and Forest*, X, p. 488.

Meng's Magnolia macrophylla. This tree, undoubtedly the earliest cultivated one of this species, was brought to the property of Mr. Meng, a wealthy Philadelphia banker (now Vernon Park), by Matthias Kin, the noted collector.

Vernon Park Papaw Trees. They are forty feet tall, with trunks ten or twelve inches in diameter, and with broad pyramidal heads of dark foliage.

The Germantown Yellow-wood (*Cladrastris flava*). The first Virgilia planted in the United States, standing by the fence of the Germantown Cricket Club.

Nuttall's Pecan Tree. An old pecan tree, one of the most famous in the city, stood, until recently, on the grounds of the M. E. Church, Germantown and High Streets. The seed was carried by Nuttall, the botanist, from Arkansas.

If space would permit, an account could be given of the traditional trees and the stories connected therewith.*

Many of the old landmarks, familiar to persons living in the city one hundred years ago, have been removed, and all traces of them lost through the growth of the city and the modern improvements substituted for the things of old. There are many fine private country places in and near Philadelphia, kept up at great expense by their owners. Rare and costly shrubs and trees have been planted, and greenhouses have been erected, to contain the rare and interesting exotics imported from all parts of the world. A book could easily be written descriptive of the botanical and horticultural aspects of these rural demesnes, but space, and the difficulty of exploration, forbid even a brief mention of the most noteworthy of these places.

* Throughout this book reference is made to the introduction and cultivation of many plants and trees. The reader is referred to the text, illustrations and footnotes, also to *Forest Leaves*, VII, p. 42, article by Ethel Austin Shrigley.

INDEX.

INDEX.

For the names of botanists included in the General List (pages 404 to 415) and the names of persons given in Appendices I and II (pages 416 to 421 inclusive), the reader is referred to the above pages of this book. A descriptive account of the illustrations is given in the fore part of this work.

Aaron's Prong, Ghost of, 314.
Abies amabilis, 289; Apollinis, 290; cephalonica, 290; cilicia, 290; concolor, 289; lasiocarpa, 289; Lowiana, 289; Nordmanniana, 289; Parsonsiana, 289.
Abolition of Faculty of Natural History, 14.
Acacia Julibrissin, 70.
Academy of Natural Sciences, Phila., 97; herbarium of, 23 et seq.; foundation, 23; Journal of, 423; location of, 188; Proceedings of the, 423.
Account of Bartram's library, 71.
Acer leucoderme, 385; macrophyllum, 256.
Acorns of mossy-cup oak, 349.
Acorus Calamus, 19.
Action of Aniline Dyes on Vegetable Tissues, 371.
Additions to our Native Flora, 242.
Adlumia, 147.
Adulteration of Drugs and Chemical Preparations, On the, 277.
Adulterations of Elm Bark, 378.
Aerating Organs of Swamp Plants, 339.
Aesculus Hippocastanum, 66.
Agassiz, Professor L. and Penikese, 304.
Agricultural Botany, Darlington's, 140.
Aitcheson, Major J. E. T., 28.
Aiton, William, 96.
Alaska, Flora of, 310.
Alaska Lichens, 310.
Alaskan plants, 29.
Albertini, J. B. d', 128.
Alectoria Cetrariza, 357.
Alexiowitz, Iwan, story by, 59.
Algerian plants, 25.
Alleghany River, 54.
Alluvium, 2.
Almonds at Bartram's, 70.
Aloes, 21.
Alpine flora of Switzerland studied, 396.
Alstrœmeria fecula, 207.
Alterations by Eastwick, 61.
Alumni Report, Philadelphia College of Pharmacy, account of, 424.
Algæ, freshwater, 222; of the New Jersey coast, 323; Prodromus of Freshwater, 317; study of, 411.
Amanitine, 315.
American Birds, List of, 87.
American forestry exhibit, 37.
American Gardener's Calendar, The, 118.
American Gardener, M'Mahon's, 183.
American Journal of Pharmacy, 23; editorship of, 276; account of, 424.
American Naturalist, The, 425.
American Ornithology, The, 87.
American Philosophical Society, 27, 40, 90, 94, 95, 96, 97, 108; Proceedings of, 422.
American Weeds, Two Centuries of, 291.
Amphicarpæa monoica, Life History of, 413.
Analytical Chemistry, Hand-book of, 364.
Anatomy, Elements of, 354.
Anatomy, a special department of botany, 355.
Anders, J. M., biography of, 350.
Anderson, F. W., 266.
Andrœcium of the Fumariaceæ, 310.
Andropogon, Notes on, 360.
Anemone of the Section Pulsatilla, 158.
Aniline Dyes, Action of, 371.
Animal temperatures, essay on, 200.
Animal and Plants, Geographical Distribution of, 192.
Angelica dichotoma, 218.
Annual Fruited Oaks, 235.
Antidote of Amanitin, 315.
Antidromy, Internal; Observations on, 294.
Ants, Chapters on, 301.
Apgar, Austin Craig, biography of, 304.
Aphyllon uniflorum, Paper on, 414.
Apocynaceæ in Materia Medica, 378.
Appendices, 416–436.
Apples at Bartram's, 70.
Apricots at Bartram's, 70.
Appropriations by Congress, 39.
Arachis hypogæa, 398.
Arbeit of Professor Kraemer, 389.
Arboretum of J. K. Eshlemann, 208; of the Jacksons, 408; of the Painter brothers, 185; of the Peirce brothers, 410; of the University of Pennsylvania, 18; Arnold, 391.
Arbor Vitæ, 256.
Arbustum Americauum. 7, 80, 98, 120.
Arbustrum Americanum (see ante).
Aristol, Nature of, 377,
Arizona Potato, The, 310.
Arizona plants, 282.
Arkansas Territory, Travels in, 159.
Arnold Arboretum, 391.
Arrangement of Lewis and Clark expedition, 118.
Artemisia Rothrockii, 309.
Articles by Durand, 175; Rafinesque, 148; Solomon Conrad, 126; Mrs. Treat, 301.
Arthur, Prof. J. C., 404.
Asarum Canadense, 218, 390; structure of. 335.
Ascent of Mount Washington, 19.
Asclepiadaceæ, Genus of, 309.

Ascomycetes, Rehm's, 270.
Asimina triloba, Cultivation of, 65.
Ash, The White, 311.
Ashmead collection of marine algæ, 25.
Aspidium aculeatum, 218; Lonchitis, 218.
Asplenium Bradleyi, 388; ebenoides, 218.
Aster cordifolius, 242; Torreyi, 242.
Asterina, Synopsis of, 248.
Astragalus mollissimus, 242.
Astronomic work of Jacob Ennis, 198.
Atlantic City Diatoms, 352.
Atlantic Ocean, 4.
Atlas of the United States, 239.
Attractiveness of the Philadelphia District, 4.
Audibertia Vaseyi, 242.
Austin, Col. F., 25; Collections of, 326.
Austin, Mrs., Collections of, 282.
Australian fungi, 267; palm, 33; plants, 28, 29.
Autobiographical Notes of Ezra Michener, 178.
Auxiliary Faculty of Medicine, endowment of, 15, 182.
Azalea calendulacea, 87; lutea, 384; white, 20.

Babbington, Prof. C. C., 249.
Bache, Franklin, Biographical Memoir of, 182.
Bachelor's Hall, a poem, 43.
Bacteriological papers, 412.
Bahamas and Jamaica, Observations on, 312.
Bahama Plants, 372.
Bailey, Prof. L. H., 404; letter from, 67.
Bald Cypress, Studies on, 338.
Baldwin, Dr. William, 24, 219; biography of, 119; papers of, 124; travels of, 122, 123.
Balfour, John Hutton, 367.
Balfour, Prof., 368.
Ballast plants, 211, 220, 328; at South Bethlehem, 243.
Balsam of Peru, 208.
Bambusa Stems and Incandescent Lighting, 340.
Banks' herbarium, 116.
Banks, Sir Joseph, 102; correspondence with Moses Marshall, 101.
Barbadoes, History of, 190.
Barton, Dr. Benj. S., 160; biography of, 108; book of, 7; botanical teaching of, 12; portrait of, 108; and Nuttall, 112, 152; patron of Pursh, 114.
Barton's Elements of Botany, 87.
Barton, W. P. C., 4; biography of, 159; book of, 8.
Barton, Prof., in 1822, 14.
Bartonian Collection catalogued, 330.
Bartram, John, 4, 5, 7, 86, 141, 171, 285; biography of, 46 et seq.; letter from, 44; Botanic Garden, 169, 194; appointed King's botanist, 53; book of, 54; creed of, 57; library of, 71.
Bartram's Garden, 250, 251, 349; bought, 253; described, 63; purchase by Philadelphia, 74; visit of Pennsylvania Horticultural Society to, 88.
Bartram Park, 40.
Bartram: coat of arms, 60; cypress, 433; house built, 51; house described, 61; and Linnæus, 53; and Logan, 50; oak, 68, 433; oak, notes on, 323; room, 62; woodshed, 63.
Bartram's Preface to Medicina Britannica, 50.
Bartram's slave, Harvey, 68; travels, 54; treatment of servants, 50.
Bartram, Ann, married to Col. Carr, 69.
Bartram, William, 153; biography of, 86; elected professor in University of Pennsylvania, 86; travels of, 7, 86.
Basidiomycetes, 293.
Bastin, Edson S., 23, 389; biography of, 330.
Bay window in Marshall's house, 85.
Bean, Dr. T. H., collection of lichens, 310.
Bechdolt, Robert G., biography of, 346; travels of, 348.
Beech, The, 311, 236.
Beetles' work on Lewis and Clark plants, 28.
Belsatter, Dr. Thomas, 249.
Benjamin Franklin and the University of Pennsylvania, 12.
Bentham, George, 24.
Benzin, Purification of, 377.
Berberis, The Colorado, 310.
Beringer, George M., biography of, 377; and herbarium fund, 30.
Berlin, Botanical Museum, 29.
Berlin, laboratories in, 395.
Bernhardi, 24.
Bessey, Professor Charles E., 359.
Bibliography of Joseph Carson, 206; Frank Lamson-Scribner, 360; George Martin, 248; Nuttall, 158, 159; Thomas C. Porter, 241; John H. Redfield, 217; Rev. Francis Wolle, 223; J. T. Rothrock, 310; W. P. Wilson, 338; C. H. Kain, 352; E. A. Rau, 352; Henry Trimble, 365; J. M. Macfarlane, 371; Ida A. Keller, 381; A. A. Heller, 388; Henry Kraemer, 390; J. W. Harshberger, 396.
Biddulphoid Forms of Diatoms, 374.
Big cypress, 65.
Bigelow's Medical Botany, 94.
Big tree, 185; California, Names of, 398.
Bilgram, Hugo, biography of, 345.
Binomial system of nomenclature, 6.
Biological and Microscopical Section Academy of Natural Sciences, founded, 257.
Biological School, 11; Sketch of, 12.
Birch, black, 312; river, 311; white, 20; yellow, 312.
Birds of America, List of, 87.
Black rot, 361.
Blanc's farm, 40.
Blephilia, 147.
Blue Ridge, 1, 3.
Blunston Oak, 435.
Bodley, Rachel L., biography of, 283.
Bog garden, 19.
Boisser, collections of, 28.
Bonn, laboratory at, 395.
Bonpland Aimé, 97.
Book of Evergreens, 286.
Booth's Laboratory, 258.
Boroglyceride, 377.
Borraginaceæ, 24.
Botanic Garden of University, 113; inception of, 17; established, 370; description of, 17 et seq.
Botanic Garden at Marshallton, 82.
Botanic Station, Tropical Mexican, 398.
Botanical Check List, 242.
Botanical Gardens, Value of, 372.

Botanical Club of Philadelphia, organized, 297; mentioned, 30.
Botanical Explorations in Southern Texas during the Season of 1894, 386.
Botanical Society of Pennsylvania, organized, 371; description of, 22; Transactions and Proceedings of, 428.
Botanical trips of A. A. Heller, 384, 385 et seq.
Botanist of Peary Expedition, 367.
Botanists, General List of, 404.
Botany at College of Pharmacy, 23.
Botany, Elements of, 334.
Botany, Foreign and Home Teaching of, 310.
Botany, Stimulus of, 15.
Boundary of Venezuela and Guiana, 190.
Boxes for fungi, 267.
Boxwood, 68.
Boyer, Charles S., biography of, 372.
Bradbury, John, 153.
Brandywine Banks, 311.
Brandywine Creek, 2; region, 2.
Brasenia peltata, Glandular Hairs of, 382.
Breathing organs of bald cypress, 338.
Breintnall, Joseph, 51.
Bridges, Robert, 25; biography of, 195; oil painting of, 195.
Briosi, Giovanni, 270.
Brinton, Dr. J. Bernard, 30, 359, 376, 400; biography of, 294; death of, 319.
British Empire in India, History of, 182.
Britton, Dr. N. L., 239, 327, 359, 383, 385.
Britton & Brown's Illustrated Flora, 147.
Bromfield, W. J. (?), 164.
Bromoform, 377.
Bromus Kalmii, 341.
Broomfield, Dr., 249.
Brown, Peter, Esq., 432.
Browne, Robert H., Obituary Notice of, 218.
Brown rot, 361.
Brown, Stewardson, 25; and herbarium fund, 30.
Brunella vulgaris, A Nascent Variety of, 312.
Bryarium, The, 20.
Buckhout, Professor of State College, 261.
Bucks County, Catalogue, 341; plants, 340.
Buist, Robert, biography of, 193; and Bartram's Garden, 72; and Thomas Meehan, 250; farm of, 40.
Bulletin National Export Exposition, account of, 428.
Bunge's collections, 281.
Bunting, Dr. Martha, sketch of, 405.
Burdock Fruit, Bitter Principles of, 365.
Bureau of Education, Circular of Information, 12.
Bureau of Information, Commercial Museums, 38.
Burial Ground, Warmer, 46.
Burk, Charles.
Burk, Isaac, 25, 211, 359; plants from, 16; biography of, 220; herbarium of, 220.
Burk, Rev. Jesse Y., 221.
Burk, Dr. William H., 221.
Burpee's farm, 40.
Bush honey-suckles, 53.
Buttonwood, A Rare, 312.
Buttonwood Tree, The Rodman, 433.

Cabinet of Sciences, Chester County, 9; letter from, 13.
Cacao, Starches in, 334.
Calaveras Big-tree Grove, 395.
California: Nutmeg, 207; plants, 29; soap plant, 366; travels in, 395.
Calisaya Bark, 207.
Calkins, Col. W. W., 266.
Call, Richard Ellsworth, book by, 144.
Callitriche deflexa var Austini, 341.
Cambium, Internal, of Gelsemium, 312.
Cambridge Botanical Garden, 403.
Cambridge, seeds from, 18.
Campanulaceæ, new plants of, 159.
Camellias at Bartram's, 70.
Camellia houses, 193.
Camellia Landrethii, 193.
Camerarius, Jacob, 5.
Canadian Mosses, 272.
Canaigre, 366.
Canby, Wm. M., 16, 26, 29, 299, 327; biography of, 278; herbarium of, 279; travels of, 280.
Cape Henlopen, 1.
Cape May, 1.
Carboniferous Flora of the U. S., 317.
Carburetted Hydrogen and Exotic Plants, 245.
Card Index of Ellis's fungi, 271.
Carex torta, 341.
Carex, American Species of, 131.
Carices, Monograph of, 131; of Penna., List of, 241.
Carpenter, William C., 266.
Carr, Col. Robert, 69, 87, 88, 153; nursery of, 70.
Carson, Dr. Joseph, 25; biography of, 199; bibliography of, 206; death of, 318.
Carson, Hampton L., 202.
Carum Gairdneri, 366.
Carya tomentosa, 312.
Castanea Americana, Sexual Variations in, 323.
Castanea pumila, 390.
Catalogue of Plants at Bartram Garden, 67.
Catalogue of Plants of Delaware County, Pa., 189.
Catalogue of Plants collected by Say, 130.
Catalogus Plantarum Americæ Septentrionalis, 7, 95.
Catechu, 365.
Catesby's herbarium, 116.
Cat-fish, 1.
Cavara, Fridiano, 270; Fungi Langobardiæ Exsiccati, 270.
Cedar red, 53; white, 53; of Lebanon, 185.
Cedar swamps, 3.
Cedar Swamp Society, 4.
Cedrela sinensis, 255.
Celastrus scandens, Color in Aril of, 382.
Cell Wall, Manner of Growth of, 355.
Celtis occidentalis, 64.
Cemetery, Laurel Hill, 183.
Cemeteries, movement to modernize, 183.
Centennial Exposition, 33, 429.
Centuries of Fungi, 263, 264; of North American Fungi, 29.
Ceylon, Materia Medica of, 390.
Chamæcyparis obtusa, 291; pisifera, 291.
Chapman, Dr. A. W., 353.
Chapters on Ants, 301.
Chara, 19.
Characteres Plantarum, 45.
Chart of Class of Birds, 234; of Geology, 234; of the Races of Men, 235; of the Vegetable Kingdom, 234.

Charts, Natural History, 398; of Trees, 335.
Chartists, 249.
Check List of the Botanical Club of North America, 147; of Pennsylvania Plants, 377; of North American Plants, 387.
Chelidonium majus, On, 277.
Chemical side of botany, 23.
Cherry Barks, Structure of, 335.
Cherries at Bartram's, 70.
Chester, F. D., biography of, 379.
Chester County, botany of, 9; Cabinet of Sciences, 9, 138.
Chestnut Tree, 311.
Chevalier's Cross, Order Mérité Agricole, 359.
Chia, 310.
Chicipate, Analysis of, 375.
Chilian plants, 24, 412.
Chimaja, 310.
Chinquapin, 390.
Chisati, Prof., 337.
Chorizema, 21.
Christ in Song, Dr. Schaff's, 237.
Christianity in India, History of, 182,
Christ thorn, 68, 433.
Chronological History of Plants, 193.
Church of St. Michael's, 46.
Cicero's De Senectute, 42.
Cider press at Bartram's, 68.
Cinchona bicolorata, 207.
Cinna, Observations on, 360.
Circumnutation, Rate of in Flowering Plants, 413.
Citrate of Caffeine, 377.
City Hall and Economic Museum, 36.
City Museums, Report on, 339.
Civilization of the Indian Nations, 223.
Cladrastis, 147; flava, 436; lutea, 65.
Cladoniæ, Rehm's, 272.
Class of Birds, Chart of, 234.
Class of '73, memorial gate erected by, 22.
Classes in botany of Dr. Traill Green, 209.
Clay, 3.
Clayton, John, 65; herbarium of, 116.
Clematis ovata, 386.
Cliftonia ligustrina, 66.
Clintonia borealis, 147.
Clocks, first, in America, 46.
Cloves, Study of, 390.
Coat of Arms, Bartram, 60
Cockerell, T. D. A., 266.
Coffin made of Paulownia, 180.
Cole, Rev. J. Augustus, 267.
Cole's Latin Dictionary, 79.
Collections of Durand, 176.
Collections for an Essay toward a Materia Medica of the U. S., 110.
Collections from Japan, 35; of Ledebour, 281.
College Botany, 334.
College of Pharmacy, City of New York purchases Canby's herbarium, 279.
College of Pharmacy of Philadelphia, description of botany at, 23; herbarium of, 23; laboratory of, 23.
College of Philadelphia, 89, 109.
Collins, Zaccheus, 4, 24, 95, 153; correspondence of, 218.
Collinsia, a new genus of plants, 154.
Collinson, Peter, 4, 51, 52; letter to, 44.
Colorado plants, 29.
Colorado, Synopsis of the Flora of, 238.
Columbia College and Hosack's Garden, 116.
Columbian Exposition, 33, 34; from a botanical standpoint, 390.
Commercial and Economic Museum, 33; established, 338.
Commissioner of Foresty, 307.
Committee of Penna. Horticultural Society visits Bartram Garden in 1830, 69.
Commons, Albert, biography of, 272.
Compendium Floræ Philadelphicæ, 8, 162.
Commerce of the Prairies, 246.
Commercial Museum, herbarium of, 401.
Common Councils, Thos. Meehan's career in, 252.
Communities, Ecologic, 4.
Compass of Bartram, 52.
Conard, Henry S., 185.
Condiments, Nutritive Value of, 375.
Cone-bearing Plants of the World, 286.
Cones of hemlock, 53.
Cones of spruce, 53.
Congressional Library, 40.
Coniferæ, North American, Contributions to, 335; studied by Henry Trimble and E. S. Bastin, 366; work on, 23; study and planting of, 285; Treatise on, 286.
Conopholis, Americana, Observations on, 415.
Conrad, Solomon W., 9, 24, 15; biography of, 125.
Conservatory, lean-to, 17.
Conspectus Fungorum, 129.
Constancy of species, doctrine of, 8.
Contributions from Botanical Laboratory, University of Pennsylvania, account of, 425; contents of, 426, 427.
Cooke, Dr. M. C., 264, 266, 267; Fungi Britannici, 270.
Cooking of mushrooms and toadstools, 315.
Corema Conradii, 217, 218, 219.
Coreopsis discoidea, 341; senifolia, 349.
Cork Tissues in Rosaceous Genera, 405.
Cork Wings, Development of, 355,
Corn Smut and Superstition, 293.
Cornus florida, 255; mas, 433.
Corpus Christi, Texas, botanical trip to, 386.
Correa, Abbé, 8.
Correa da Serra, biography of, 154.
Correspondence botany classes, 368.
Costa Rica, Account of, 428.
Cost of Horticultural Hall, Fairmount Park, 430.
Coulter, Dr. John M., 327, 359.
Crawford, Joseph, biography of, 376; mentioned, 237, 239.
Creed of Bartram, 57.
Crepis tectorum, 341.
Cretaceous green sand, 3.
Cretaceous period, 2.
Critraria minutissima, 344.
Crittenden Resolutions, 252.
Cross fertilization, current views of, challenged, 381.
Cross Fertilization of Flowers by Insects, Notes on, 381.
Crosses of Teosinthe and Maize, 397.
Cruise to West Indies, 16.
Cruise of White Cap, 307.
Cuban Fungi, Wright's, 271.
Cucumis, Notes on, 401.
Cucurbits, study of, 408.
Cupressus, varieties of, 288.
Currants at Bartram's, 70.

Curtiss, Rev. Mr., 133, 281, 326.
Cymopterus, 147.
Cyperaceæ, Monograph of, 124.
Cypress, Bartram, 433.
Cypripedium, Evolution of, 334.
Cypripedium pubescens, 244.
Cyrilla racemiflora, 66.

Dahlias, Native, of Mexico, 398.
Daisy, the, and John Bartram, 47.
Damiana, 310.
Dana, Professor, 192.
Darlington, Dr. William, 4, 9, 12, 120, 164, 166, 180, 285, 305; biography of, 134; book by, 5, 83; herbarium of, 142; public services of, 137 et seq.; Reliquiæ Baldwinianæ, 97, 121.
Darlingtonia, 140, 279.
Darrach, James, biography of, 258.
Darwin, Charles, book of, 10; criticised, 299; Origin of Species, 5; and Thomas Meehan, 253, 254; views challenged, 381; Insectivorous Plants, by, 299.
Datura Tatula, Vitality of Seeds, 242.
Dearness, Mr. John, 266.
Death of Bartram, 58; of Lyon, at Asheville, N. C., 133; of John H. Redfield, resolutions on, 215.
De Bary, Professor, laboratory of, 310.
Decadon verticillata, 19,
De Candolle, Professor, of Geneva, 140.
De Hart, William, 434; sketch of, 407; his Gordonia pubescens, 66, 433.
De Lavatione Frigida, 88.
Delaware County, Catalogue of Plants, 189; History of, 189; Institute of Sciences, founding of, 189; sketch of Institute, 32.
Delaware Indians, 1.
Delaware plants, 273.
Delaware River, 1, 3, 54.
Delaware Valley Naturalists' Union, 370.
Demetrio, Rev. C. H., 266.
Demoralization of Plants, 300.
Dencke, Rev. Mr., 24, 96.
Dennert's Vergleichende Pflanzenmorphologie, Review of, 397.
Deposit of Lewis and Clark's plants, 28.
Descendants of Penn Treaty Elm, 432.
De Schweintz, L. D., 4.
Descriptio, Uberior graminum, 95.
Description of Plants collected by William Gambel, 159, 232.
Descriptions of Sphaeria, 131.
De Senectute, Cicero's 42.
Desmazieres, Plantes Cryptogames de France, 268.
Desmids, 223; of the United States, 222.
De Thumen's Fungi Austriaci, 268; Mycotheca Universalis, 268.
Detwiler, H., biography of, 246.
Development of Natural System, 8.
Development of University Garden, 17.
DeWitt, 42.
Diachoea Thomasii, 344.
Diaries of Bartram, 52.
Diary of Pursh, 115.
Diatomaceæ, fossil, 352; of North America, 222; papers on, 373.
Diatoms, Notes on, 352; Respiration in, 379; slides, 352; study of, by C. S. Boyer, 373; studied by C. H. Kain, 351.
Dickinson, Park, 253.
Dickson, Professor, 368.
Dies Iræ, 237.
Diffenbach, Elias, 211; biography of, 353.
Dillenius, 96.
Dionæa muscipula, 70, 279; Abnormal Inflorescence of, 396; History of, 372; Mrs. Treat's studies of, 299.
Dimerosporium, Synopsis of, 248.
Diplopappus ericoides, 310.
Dirca palustris, 407.
Discovery of Pursh's diary, 115.
Discovery of Victoria regia, 190.
Dispensatory, National, 277; of the United States, 182, 318.
Distribution of White Cedar in New Jersey, 402.
Divination by hazel-rod, 46.
Doctrine of constancy of species, 8.
Doctrine of sex in plants, 41.
Dog-tooth violets, 53.
Dolley, Charles S., biography of, 372.
Dome, The (see Hermitage), 43.
Donations of seeds, 18.
Dothidea, 96.
Downy mildew of grape, 362.
Dreer's farm, 40.
Dresden, laboratory in, 395.
Drexel, A. J., garden of, 399.
Drimys chilensis, 207; Winteri, 207.
Drosera, 279; Mrs. Treat's studies on, 299; filiformis and intermedia, hybrids of, 272; rotundifolia, 19.
Drude, Professor O., 337.
Drugs, 36; examination of, powdered, 390.
Drummond's Mosses, 29.
Drunkenness of Plants, 300.
Dublin, seeds from, 18.
Duke of Richmond, 52.
Dundas Elm, 433.
Dunes of Lewes, Delaware, 312.
Durand, Elias, 4, 9; collections of, 23; lamented, 26; article by, 151; biography of, 174; herbarium of, 177; and Rafinesque, 176; Index of, 325.
Dwarf trees, 340.
Dye stuffs, 36.

Eastwick, Andrew, engages Thos. Meehan, 250; fondness for Bartram's garden, 71; house burnt, 75; house torn down, 76; a locomotive builder and machinist, 71; mortgage, 71; property purchased, 72, 75.
Eatonia, 147.
Eckfeldt, John W., biography of, 356; lichens of, 29.
Ecologic: Communities, 4; Notes, 398; Study of Genus Talinum, 398; questions, 11.
Economic botany, 16, 334; at University, 16.
Economic fungi, 270.
Economic Museum, 33.
Edible fungi, 315.
Edict of Nantes, 149.
Edinburgh Botanic Garden, curator of, 193; seeds from, 18.
Edinburgh Coal Fields, fossil flora of, 367.
Eisenhower, Chief, 75.
Electric Lighting and Stems of Bamboo, 340.
Elements of Botany, Barton, 7, 87, 110.
Elementary Botany, Macloskie, 294.
Elements of Plant Anatomy, 355.

Elements of Natural History, 412.
Elevation of southern New Jersey.
Elliott, Stephen, 24, 96; book of, 121; flora of, 282.
Ellis, Job. B., 11, 345, 346; biography of, 259; centuries of fungi, 29; associated with B. M. Everhardt, 227; moves to Newfield, N. J., 262.
Ellis's fungi, card index to, 271.
Elm, The American; The White, 311.
El Maiz: Estudio Botánico y Económico, 392.
Elm Bark, Adulterations of, 378.
Ely, Mrs. Theodore, 32.
Embryo Sacs, Development of, 410.
Emesby, Reply to, 310.
Empire Building, 36.
Endowment of an Auxiliary Faculty of Medicine, 182.
Engelman, Dr. George, 280, 282, 286.
Engler and Prantl System, 18.
English dictionary, 394.
Engraved stone of south gable, Bartram house, 59.
Engraved stone over window, east front, 57.
Engraving of Baldwin, 119.
Ennis, Jacob, biography of, 197; conducts field excursions, 198; excursions of, 391; missionary labors in Java and Sumatra, 197.
Enslen, Aloysius, 116.
Enteridium Royeanum, 363.
Enumeration of publications of Rafinesque, 148.
Epigaea repens, Observations on, 339.
Equator, Accumulation of Plant Life at, 348.
Eragrostis Purshii, 342.
Eranthis hyemalis, 349
Ericaceæ, new plants of, 159.
Eriksson's Fungi Parasitici Scandinavici Exsiccati, 269.
Eriochloa, A New, 360.
Eriodictyon glutinosum, 310.
Erythræa chilensis, 206; Muhlenbergii, 96.
Eshlemann, Jacob, 208; biography of, 208.
Essay on Scammony, 207.
Estate of William Hamilton, 113.
Estate of Nuttall, 157.
Estimate of the work of J. B. Ellis, 265.
Ethno-botany, 397.
Ethno-botanical subjects, lectures on, 393.
Eugenia Garberi, 302.
Eupatorium purpureum, 366.
Euphorbia heterophylla, 70.
Euphrasia officinalis, 219.
European botanists, views of, 10.
European cornel, 433.
European trip of J. W. Harshberger, 395.
Evans, John, 4, 185; biography of, 167; garden of, 169; location of, 172; and his Garden, 398.
Evergreens, Book of, 286.
Everhart, Benjamin M., 11, 266; associated with J. B. Ellis, 264, 227; biography of, 227.
Evolution in plants, study of, 408.
Evolution, Rafinesque's views on, 147.
Examination of Powdered Drugs, 390.
Excursions of the Botanical Society of Pennsylvania, 22; of J. Bernard Brinton, 296.
Exhibits from Argentine Republic, 35; from Mexico, 35; of World's Fair, 253, 338; procured from foreign countries, 34.
Exploring expedition of Lieut. Wheeler, 306; to South Seas, 191.
Exploration of White Mountains, 191.
Experimenta et Meletemata Plantarum, 5. 41.
Experimental beds, 17; farms near city, 40.
Exposition of 1899, 39.
Exsiccati of J. B. Ellis, 271.

Faculty of Natural History, institution of, 14.
Fahnestock, George W., biography of, 245.
Fairmount Park, 2, 33, 40; flora of, 220; planting of trees in, 349.
Family Kitchen Garden, 195.
Family of Muhlenberg, 92.
Farlow, Prof. W. G., 263, 359.
Fecula of Alstrœmeria, 207.
Fedias of eastern United States, 242.
Fendler, plants of, 26; Venezuelan fungi, 271.
Ferns, Dr. Eckfeldt's collection of, 358; of North America, 218; from Rock Castle, 327; in South Florida, 303.
Fertilization of Flowers, 310.
Field excursions, 31; by Jacob Ennis, 198.
Field and garden plants, lectures on, 393.
Fighting Rocks, Waifs of, 314.
Filberts at Bartram's, 70.
Finland Fungi, 269.
Finnish literature, Dr. Porter's contribution to, 239.
Fire, at Bartram's, 75; in Herbarium of Lafayette College, 238.
Fire sand, 3.
First botanical professor in America, 7.
First period of botany in Philadelphia, 5.
Fish, Fishing, Fisheries of Pennsylvania, pamphlet on, 367.
Flaxseed Meal, Sophistication of, 378.
Flora of Alaska, 310.
Flora Americæ Septentrionalis, 8, 27, 111, 116.
Flora Boreali Americana, 114.
Flora Cestrica, 9, 140, 167, 180, 224, 234, 273; indebted to Joshua Hoopes, 166.
Flora of Fairmount Park, 220.
Flora of geysers, studied, 395.
Flora Lancastriensis, 94.
Flora of Lehigh County, 292, 330; of Martha's Vineyard and Nantucket, 219; of Mount Desert, Me., 219; of New Jersey, studied by Mrs. Treat, 299; of North America, 160, 162; of the Northern and Middle States, 151; of the Westtown Farm, 244.
Flora Philadelphicæ, 179.
Flora Philadelphicæ Prodromus, 162.
Floral Structures, Origin of, 312.
Florida Plants, Two new, 242.
Florida plants, 25.
Florula Cestrica, 9, 13[2], 140, 168, 180.
Flowers, Fertilization of, 310.
Flower Garden Directory, 195.
Flowers and Ferns of the United States, The Native, 251.
Flowers, water color sketches of, 414.
Food-fishes, 1.

Foreign Plants, Introduction of, 327.
Forest Growth, Sanitary Influence of, 327.
Forest Leaves, 32, 311; account of, 425.
Forest Leaves, paintings of, 234.
Forest primeval, 311.
Forest Preserves, sections suited for, 309.
Forest Trees of America, translation of, 193.
Forest Trees, Pennsylvania and New Jersey, 1.
Forester, The, 402; account of, 427.
Forester of New Jersey, 402.
Forester of Philadelphia, 75.
Forestry, 16.
Forestry Commissioner of the U. S., 29.
Forest Commissioner of Pennsylvania, 32, 307.
Forestry Commission Report, 308.
Forestry, Report on, 307, 313.
Forestry School at Munich, 402.
Fothergill, Dr. John, 5; biography of, 86.
Fotterall Square, 117; Park, 263.
Founders' Day at Lafayette College, 239.
Founding of M'Mahon's Garden, 118.
Fouquieria splendens, Analysis of Bark of, 375.
Fourth period of botany in Phila., 10.
Frankford Park, 253.
Franklin, Dr. Benjamin, 6, 102.
Franklinia, 66.
Franklin Institute, 40; Journal of, 423.
Franklin stove. 246.
Fraxinus Greggii, 246.
Free Library Company, 40.
Fresh-water Algæ of the United States, 222.
Fretz, C. D., biography of, 340.
Fuchsia, hybridizing of, 249.
Fullerton, Vice-Provost, 18, 370.
Fumariaceæ, Androecium of, 310.
Fungi, 273, 390; boxes for, 267; edible, 315; poisonous, 315.
Fungi Americani, Ravenel, 267; Austriaci, 268; Britannici, 270; Caroliniani Exsiccati Ravenel, 287; Europæi, 268; Exsiccati Scandinavici, 270; Gallici, 271; Guaranitici, 269; Hungarici, 352; Langobardiæ Exsiccati, 270; Nova Cæsariensis, 263; Parasitici Scandinavici Exsiccati, 269; Saxonici Exsiccati, 269; Selecti, 271.
Fungi, habitat list of, 346; host index of, 346; study of, by B. M. Everhart, 227; by Dr. Herbst, 293.
Fungicides, 362.
Funghi Parassiti del Piante Coltivate od Utili, 270.
Fussell, Edwin, biography of, 247.
Fussell, Linnæus, M. D., biography of, 328.

Galls, Four Oak, from India, 366.
Galls, Some American, 366.
Galveston Advertiser. 246.
Gambel, William, biography of, 231; fate of, 232; plants of, 157.
Gambelia speciosa, 232.
Gambier, 365.
Garber, Dr. A. P., 4, 25, 282, 347; biography of, 302; excursion to Puerto Rico, 303.
Garberia, 303.
Garden of Bartram started, 58.
Garden, Botanic, at University of Pennsylvania, 17.
Garden of John Evans, description of, 169 et seq.
Garden of Dr. Hosack, 115.
Garden of medicinal plants on Lower Wissahickon, 5.
Garden Pets, My, 301.
Gardeners' Monthly, account of, 424.
Gaurineæ, North American, 310.
Ghost of Aaron's Prong, 314.
Gifford, John, 427; biography of, 401; travels of, 402.
Gingko biloba, 113: at Woodlands, 434.
Ginseng, 53; cultivation of, 366.
Girard College, History of, 182.
Girdled Limb, Vitality of, 304.
Glacial gravel deposit, 17.
Glass sand, 2.
Glossary wall, 225.
Goddard, Dr. Paul B., 25, 195.
Gœthe's Hermann and Dorothea, 237.
Goodale, Prof. George L., 336.
Gordonia Altamaha, 256; pubescens, 407, 431.
Gordonia pubescens collected by the Bartrams, 66; De Hart's, 433.
Göttingen, University of, 336.
Governor Logan, 5.
Gelsemium sempervirens, Internal Cambium of, 312; Internal Phloem of, 414.
Genera of North American Plants, 8, 153.
Genera Plantarum, Bentham and Hooker, 325.
Genera of Rafinesque, 147.
General List of Botanists, 404.
Gentiana alba, 242; Andrewsii, 293; Chirayita, 207.
Geographical Biology, 396; botany, 16; distribution, 11.
Geographical Distribution of Animals and Plants, 192.
Geology of Philadelphia, 2.
Geology, Chart of, 234.
Geranium maculatum, Structure of, 335.
Gerard's Herbal, 79.
German Pietists, 5.
Germantown yellow-wood, 436.
Geyser flora studied, 395.
Graham, Hugh, nursery of, 400.
Gramineæ, papers on, 360, 361, 362.
Grapes at Bartram's, 70.
Grape, books on, 404.
Grape vine diseases, 361.
Grandfather Mount visited botanically, 384.
Grass herbarium of F. Lamson-Scribner, 359.
Grass Names, Index of, 361.
Grasses, American (illustrated), 362; Economic, 362; of Muhlenberg, 96; of Pennsylvania, List of, 242; of Philadelphia, 330; papers on, 360, 361, 362; as Sand and Soil Binders, 362; Useful and Ornamental, 362.
Gravel banks, 17.
Gravel, yellow, 2.
Grave of Rafinesque, 146.
Grave-stone of Bartram's slave, 68; of Dr. William Darlington, 143.
Gray, Dr. Asa, 25, 26, 246, 280, 282, 286, 297, 327, 336; tries to dissuade Mrs. Treat, 300; remarks on death of, 312, 340; and John H. Redfield, 213; writes to Edward Tatnall, 225, 226.

Gray Herbarium, 403.
Gray's Atlas of the United States, 239.
Gray's Manual, 147; Review of Sixth Edition, 242.
Great Egg Harbor River, 3.
Grecian plants, 281.
Greek inscription on Bartram house, 59.
Green, Dr. Traill, biography of, 209, 280.
Green, Prof. E. L., 282, 327.
Greeneria fuliginea, 362.
Greenhouse, cost of erection, 14.
Greenhouses, description of University, 20 et seq.
Greenman, Jesse M., 28, 239; biography of, 403.
Green sand, cretaceous, 3.
Gregg, Josiah, biography of, 246.
Greggia, 246.
Gregory, Emily L., 11; biography of, 353.
Growth of small parks, 252.
Guatemala, account of Republic of, 428.
Guiana, paper on, 190.
Guiana and Venezuela, boundary of, 190.
Gums and Resins, Classification of, 409.

Habenaria Garberi, 242, 302; grandiflora, 244.
Helenia Rothrockii, 309.
Halesia Meehani, 255.
Halstead, Prof. Byron, 291.
Haines, Reuben, 153.
Hamilton, William, 133; estate of, 113; of Woodlands, 434.
Hamilton Walk, 21.
Hanbury Gold Medal, 278.
Hand-book of Analytical Chemistry, 364.
Hand-book of Ornamental Trees, 251; written at Bartram Garden, 63.
Harfordia, Notes on, 242.
Harkness Dr. H. W., 266.
Harrison, Dr. C. C., 17, 18, 75, 370; generosity of, 20.
Harrowgate Park, 253.
Harshberger, John W., 11, 16, 23; article by, 5, 172; teaching of, 16; biography of, 391; European trip of, 395.
Hawaiian Islands, Flora of, 387.
Hazel-rod in divination, 46.
Harvey, slave of Bartram, 68.
Heermann's collections, 10.
Heister, John P., 292; biography of, 186.
Helenium Hoopesii, 166.
Helleborus niger, 207.
Heller, A. A., biography of, 382.
Helonias bullata, 19; in New Jersey, 352.
Hemiarcyria clavata, 344.
Hemlock, The, 311.
Hemlock Barks, Structure of, 335.
Hemlock cones, 53.
Henslow, Rev. Geo. and Thos. Meehan, 254.
Henslow, Rev. Geo., book of, 312.
Hepaticæ, 25, 273.
Herbal of Parkinson, 50.
Herbalists, 5.
Herbarium of the Academy of Natural Sciences of Philadelphia, 218; sketch of, 23 et seq.; and J. H. Redfield, 214.
Herbaria of Clayton, Pallas, Plukenet, Catesby, Morison, Sherard, Walter, Banks, 116.
Herbarium of Isaac Burk, 220; William Canby, 279; College of Pharmacy, 23; Columbia University, 30; of Commercial Museums, 401; Dr. Darlington, 142; Department of Agriculture, 30; of De Schweinitz, 130; of Durand, 177; of Edinburgh Botanic Garden, 368; of J. W. Harshberger, 394; of Harvard, 30; of Lafayette College, 238; of Lambert, 27; of J. C. Martindale, 324; of Menke, 24, 196; Missouri Botanical Garden, 30; of Muhlenberg, 96, 218; North American, 26; of Pennsylvania, 238; of Rafinesque, 146; of Aubrey H. Smith, 210; of the University of Pennsylvania, 16.
Herbst, Dr. Wm., 186, 291, 330; biography of, 29.
Heritage, Benjamin, biography of, 29.
Hermitage (incorrectly Monastery), garden at, 43.
Heuchera Americana, Structure of, 335.
Hibbert and Buist, 194.
Hibbert's florist establishment, 194.
Hickories, The, 236.
Hickory, The Butter Nut, 311; Shell Bark, 311.
Hicks, G. H., Article by, 144.
Hieracium aurantiacum, 219.
Hildebrand's Flora of the Hawaiian Islands, 387.
Himalaya seeds, 169.
Historic Mansions and Buildings of Philadelphia, 42.
Historical Society of Pennsylvania, 40.
History of Barbadoes, 190; of the British Empire in India, 182; of Christianity in India, 182; Chronological, of Plants, 193; of Delaware Co., 167, 189; of Girard College, 182; of Haverford College, 174; of the Medical Department of the Univ. of Pa., 205, 208; of the Pennsylvania Hospital, 182; of the Univ. of Pa., 182.
Histoire des arbres forestiers de l'Amerique, 7.
Histoire des Chênes de l'Amerique, 7.
Hitchcock, Dr. Edward, 292.
Holcus bicolor, a substitute for chocolate, 162.
Holway, E. W. D., 266.
Home Studies in Nature, 299.
Honey Glands of Pitcher plants, 371.
Honey Locust, 312.
Hongos Sud Americanos, 269.
Hooker, Sir Wm. J., 24, 163, 195, 250.
Hoopes, Joshua, 4, 164, 285; biography of, 285.
Hoopesia, 166.
Hop hornbeam, 312.
Horoscopy practiced, 46.
Horticultural Building, Fairmount Park, 33; account of, 429.
Horticultural Society of Penna., 40.
Horticulture in Philadelphia, strides of, 194.
Hot-houses at Bartram's, 70.
Hot springs, Vegetation of, 398.
House of Bartram described, 61; of Eastwick, 78; of H. Marshall, 84.
House Plants as Sanitary Agents, 350.
House of Rafinesque, 146.
Hovenia dulcis, 255.
How to Know Trees, 304.
Humboldt, Alexander von, 97.
Hungarian Fungi, Linhart, 268.
Hungarian Daisy, Sophisticated with Insect Powder, 378
Hunt, J. Gibbons, 11; biography of, 257.

Huxley, Professor, 235.
Hyacinths, Water, 19.
Hybrids of Drosera filiformis and D. intermedia, 372.
Hybrid of Maize and Teosinthe, Notes on, 397.
Hybrids, Minute Structure of, 371.
Hybrid Plants, publications on, 369.
Hybridity of Bartram Oak, 68.
Hydrocarbons in Plants, 376.
Hydrocharite Society, 4.
Hydrographic features of Philadelphia, 13.
Hyoscyamus niger, 109.
Hypophosphorous Acid, 377.

Idaho, botanical trips to, 385, 387.
Ilysanthes, 147.
Illustrated Flora, Britton and Brown's, 147.
Illustrations of Medical Botany, 203, 207.
Imbibition of Seeds, Heat of, 294.
Immigration of Maisch to America, 274.
Imperial Academy of Erlangen, 97.
Improvements at Bartram's Garden, 75.
Inception of the Lewis and Clark expedition, 105.
Independence Hall, 42.
Index Flora Lancastriensis, 94.
Index of the Genera in the Herbarium of the Academy of Natural Sciences, 195.
India Cinnamon, 207.
India Opium, 207.
Indian Food Plants, 365, 366.
Indian fungi, 267.
Indian Plant Hunter, The, 184.
Indian plants, 24.
Indians, Delaware, 1.
Injurious Insects of the Farm and Garden, 301.
Inoculation for Smallpox, 101.
Inscription on Gravestone of Dr. Darlington, 143.
Inscription over window, 57, 60.
Insect Menagerie, 299.
Insectivorous plants, articles on, 279; Pitchered, 371.
Insectivorous Plants, Darwin's, 299.
Inside of Bartram house, 61; Marshall house, 84.
Institution of Natural History Faculty, 14.
Insular vegetation, 219.
Intramolecular respiration, 339.
Introduction, 1.
Introduction of Lombardy Poplar and Norway Maple, 434.
Introduction to Systematic and Physiological Botany, 155.
Iris bed, 19.
Iris, Structure of, 335.
Iron wood, 312.
Iroquois Lake, 54.
Irritable Stamens in the Flowers of Portulaca grandiflora, 249.
Irrito-contractility in Plants, 372.
Isoetes Engelmanni, 34; saccharata, 379.
Italian collections, 281.
Ithan Creek, 172.
Ivy Lodge, Germantown, 183.

Jackson arboretum, Londongrove, Pa., 408.
Jackson, Halliday, biography of, 223.
Jalap plant, 206.
James, Thomas P., 11; biography of, 186; and Pursh's Diary, 115; removes to Cambridge, 187; associated with Lesquereux, 187
Jardin des Plantes, 8, 186.
Jaune des Prez, 194.
Jayne, Dr. Horace, liberality of, 15.
Jefferson, 27; and Lewis and Clark expedition, 55; and Western exploration, 105.
Jefferson Medical College, newly started, 14.
Jena, seeds from, 18.
Joad, Geo. Curling, 29.
Job, Thomas, 272.
Johnson, Wm. Poyntell, 203.
Jones, Commodore T. Ap. Catesby, 19.
Jordan, David S., 304.
Journal of the Academy of Natural Science, account of, 423; article in, 10.
Journal Franklin Institute, account of, 423.
Journal of Pharmacy, The American, 23.
Journeys of De Schweinitz, 129.
Jujube tree, 256.
Juncus, 19; species of near Lancaster, 242.
Juniata Park, 253.
Juniperus, 20, 290.
Jussieu, Antoine Laurent de, 8.
Jussieu, Bernard de, 8.
Jussieu's System, 8.
Justice of Peace, Moses Marshall as, 107.

Kain, Charles Henry, biography of, 350.
Kalm, Peter, 4, 6; biography of, 77; book of, 77; and Linnæus; travels, 6.
Kalmias, 20.
Kalevala, The, 237.
Kansas fungi, 270.
Karsten, Dr. P. A., of Mustiala, Finland, 269.
Keck, Karl, specimens of, 281.
Keen, Dr. G. B., 117.
Keller, Dr. Ida, 11; biography of, 380; work on local flora, 31.
Kellermann, Dr. W. A., 266.
Kellermann and Swingle Kansas fungi, 270.
Kellogg, 26, 281.
Kelpius, 5; death of, 42.
Kelsey, Rev. F. D., 266.
Kentucky coffee-tree, 70, 311.
Kew Garden, 19, 139.
Key West, Fla., collecting trip to, 348.
Kilvington, Robert, biography of, 188.
Kimber, Abigail, biography of, 167; teacher of Grace Anna Lewis, 234.
Kin, Mathias, 436; biography of, 184.
King's, Clarence, expedition of, 187.
Kingsessing, 47, 78, 86, 165.
Knees of bald cypress, 338.
Kraemer, Dr. Henry, 11, 22, 23; biography of, 388.
Kramph, Rev. Samuel, 96.
Krieger's Fungi Saxonici Exsiccati, 269.
Krout, Dr. A. F. K., 422; biography of, 328.
Krug, Prof. Leopold, 29.
Kuhn, Dr. Adam, 4, 6, 12; biography of, 88; medical study of, 88; election to College of Philadelphia, 89; lectures of, 90; and Linnæus, 88; portrait of, 88.

Kuhnia, 91.
Kuhnistera, Notes on, 388.
Kunders, Thones, 125.
Kunze's Fungi Selecti, 271.
Kuram Valley, Afghanistan, 28.
Kyllingia, 124.

Labiatæ, 24.
Laboratories at Bonn, Berlin, Dresden, Munich, 395.
Laboratory of the College of Pharmacy, 23; of Professor De Bary, 310.
Laboratory Exercises in Botany, 334.
Lafayette College, 209; herbarium of, 288.
Lambert's Herbarium, 27.
Lamson-Scribner, Frank, 358; bibliography of, 360.
Lancaster County, Lichens of, 388; plants of, 241.
Langlois, Rev. A. B., 266.
Landmarks of Old Philadelphia fast disappearing, 436.
Landreth, David, biography of, 91; nursery of, 193. 194.
Landreth's farm, 40; mansion, 91.
Landreth Public School, 91.
Latitude of Philadelphia, 1.
Laurel Hill Cemetery, 183.
Lea, Thos. G., of Cincinnati, 25.
Leaf scab of orange, 362.
Le Boutillier, Roberts, 21, 22.
Le Conte, John Eatton, biography of, 149; portrait of, 149.
Lectures of John F. Waterhouse, 173.
Legend of Polecat Hollow, 315.
Leguminosæ, Poisonous Properties of, 310.
Lehigh County flora, 292, 330.
Leidy, Dr. Joseph, 259, 338; plants of, 16.
Lemmon, Professor, 16, 26, 282, 326.
Lemna trisulca, 341.
Lemon Hill, Fairmount Park, 194.
Leon, Dr. Nicolas, 392; sketch of, 395.
Lepidophloios, paper on, 369; on, 371.
Lepidoptera, collection of, 324,
Lespedeza striata, 242.
Lesquereux's algæ, 25.
Lesquereux and James, 187; Manual of Mosses by, 352.
Lewis and Clark plants, account of, 26 et seq.; re-discovered, 116.
Lewis and Clark's expedition, inception of, 105; arrangement of, 118.
Lewis, Grace Anna, 167; biography of, 233.
Lewis, John F., 75.
Letter of Gen. I. J. Wistar to Prof. C. S. Sargent, 232.
Liatris Garberi, 302; Helleri, 384.
Liatris, A new, 242.
Library, Bartram Memorial Botanical, 76.
Library of Bartram family, 71; of Commercial Museum, 38; of Painter, 185; of John H. Redfield, 217.
Library facilities of Philadelphia, 401.
Library, Loganian, 41.
Libriform tissue, Pores of, 355.
Licea minima, 344.
Lichens, 273; of Alaska, 310; collection of, 272; Dr. Eckfeldt's, 357; papers on, by Dr. Eckfeldt; of Lancaster Co., Pa., 388.
Lichenotheca Universalis, 272.
Life and Labors of St. Augustine, 237.
Life and Writings of Rafinesque, 144.
Life and Times of Ulric Zwingli, 237.
Lilium auratum, 218; Carolinianum, 384;
Lilley, Robert B., 85.
Lincoln, Mrs., botanical book of, 292.
Lindbladia, 343.
Linden, The American, 311.
Lindheimer, plants of, 26.
Lindley's Vegetable Kingdom used, 284.
Linhart's Hungarian Fungi, 268.
Linnæan enthusiasm, 6; ideas, 5; system, 6; Society of Lancaster, 238.
Linnæus and Bartram, 53; and Kalm, 77; and Kuhn, 88.
Linnæus' Characteres Plantarum, 45.
Liparis liliifolia, 260.
Lippincott, Wm., 344.
Liquor Carbonis detergens, 377.
List of American Birds, 87.
Loan bill of Philadelphia, 39.
Lobeliaceæ, New plants of, 159.
Loblolly pine, 311.
Location of the Academy of Natural Sciences, 188; of M'Mahon's Garden, 117; of Evans' Garden, 172.
Loco Weeds, Notes on, 378.
Locust, Honey, 312.
Logan, James, 4, 5; and Bartram, 50; biography of, 41; paintings of, 42.
Loganiaceæ, 253.
Loganian Library, 41.
Lojka's Lichenotheca Universalis, 272.
Lombardy poplar, introduced, 434.
Longitude of Philadelphia, 1.
Lonicera tartarica, 118.
Lord Petre, 52.
Lotus Helleri, 384.
Lowe, Dr. Clement B., 23, 389; biography of, 344.
Lowe, Mrs. Josephine B., 422.
Lower and Higher Plants, Chemistry of, 376.
Lowrie, J. R., 242.
Ludwig, Dr. De B. K., 393.
Luzerne County, Pa., Flora of, 388.
Lychnis vespertina, 226.
Lygodium palmatum, 218, 260.
Lyon, John, 114; biograghy of, 133; plants of, 116.
Lyonia, 133.

MacElwee, Alexander, 422; biography of, 399.
Macfarlane, John M., 11, 22; and Bartram's Garden, 75; biography of, 367; plans for garden, 17; teaching of, 16.
Macloskie, George, biography of, 293; receives medal, 294.
Maclura aurantiaca, origin of name, 409.
Maclure, Wm., 154.
Macoun, Dr. John, 266, 327; Canadian Mosses of, 272.
Magnolia acuminata, 65, 83; Fraseri, 65, 87; glauca, 243; grandiflora, 113; macrophylla, 185, 410; umbrella, 185; swamp, 20, 312.
Magnolia macrophylla, Meng's at Vernon Park, 436.
Mahonia, 153.
Maisch, Prof. John M., 344, 365, 389; address of, 92; biography of, 273; at Philadelphia College of Pharmacy, 276.
Maize, Work on, 41; and Teosinthe, Crosses of, 397.

Maize: A Botanical and Economic Study, 392; translation of, 392.
Malate of Iron, 377.
Manual, Gray's, 148.
Manual of the Mosses of North America, 187; review of, 352.
Manual of Organic Materia Medica, 277.
Manual of the Ornithology of the United States and Canada, 155.
Maple, Silver, 311; Soft, 311; The Sugar, 311; White, 311.
Marl beds, 3.
Martha's Vineyard, Flora of, 219.
Martin, Dr. George, 29, 266, 310; biography of, 247; studies of fungi, 248.
Martindale, Isaac, 4, 26, 2, 11; notice of, 219, 263, 359; biography of, 322; collections of, 23; herbarium of, 324, 334, 400; collections of Lepidoptera, 324.
Martius, Von, 24.
Marshall, Humphry, 4, 7, 102, 141, 171; Arbustum Americanum, 7; biography of, 77.
Marshallton, Botanic Garden at, 82.
Marshall's house, inside of, 14.
Marshall, Moses, 120; biography of, 97; travels of, 102, 105.
Marshallia, 81, 103, 104.
Marsilia quadrifolia, 19.
Masters, Dr. Maxwell T., 286.
Materia Medica at College of Pharmacy, 23; Treatise on, 318.
Maupay's garden, 194.
Mauvaises Terres, Plants of, 241.
McCalla, Edmund G., biography of, 348.
McDowell family at Asheville, N. C., 133.
McIlvaine, Capt. Charles, 32; biography of, 313.
M'Mahon, Bernard, biography of, 117.
M'Mahon's American Gardener, 183; garden, 91, 194; location of garden, 117.
McNab, James, late Curator Edinburgh Garden, 193.
Michael, Helen Abbott, 375.
Michener, Ezra, biography of, 178.
Michaux, André, 4, 7; book of, 7.
Michaux, the elder, 384.
Michaux, Grove, Fairmount Park, 434.
Michaux Lecture Fund, 309.
Michaux's Flora Boreali Americana, 114; Forest Trees of America, translation of, 183.
Micro Fungi Britannici, 270.
Microscope, A Convenient, 310.
Microscope, perfection of, 5.
Microscopic Studies, 224.
Miscroscopes of Zentmayer, 224.
Migration of Plants, 348.
Mill, John Stuart, collection of, 25.
Miller, Dr. Adolph W., 22; biography of, 319.
Mimicry in Plants, 312.
Medical Botany, Bigelow's 94; Illustrations of, 203.
Medical Department of the University, History of, 205, 208.
Medical garden of Rosicrucian Mystics, 43.
Medieval scolasticism, 5.
Medlars at Bartram's, 70.
Medullary Rays and Timber Strength, 312.
Meehan, Prof. Thomas, 11, 25, 26, 29, 33; and Bartram Garden, 63, 72, 74; biography of, 249; Handbook of Ornamental Trees, 251; and herbarium fund, 30; observations on plants, 254; elected a visitor of Harvard University, 251.
Meehan's Monthly, started, 252; sketch of, 424.
Meehan's Nursery, description of, 254 et seq.
Meehan and Wandell, 250.
Meehan, William E., 29; biography of, 366.
Meetings organizing Bartram Memorial Library, 76.
Meissner Herbarium of Columbia College, 247.
Melicæ, Revision of, 360.
Melitotus alba, Movements of Leaves of, 339.
Meliola, Synopsis of, 248.
Mellichamp, Dr., 282.
Memoranda of the Effects of Carburetted Hydrogen Gas on a Collection of Exotic Plants, 245.
Memorials of Bartram and Marshall, 83, 141.
Memorial botanical library, 76.
Memorial Fund, Redfield, 217.
Memorial, gate-way, 21.
Memorial Meetings, Dr. Traill Green, 209.
Meng, Mr., 184; Magnolia macrophylla of, 436.
Menke's Herbarium, 24, 196.
Menyanthes trifoliata, 174.
Mexico, Botanical Excursion to, 397.
Mexican Flora, Observations on, 398.
Mexican plants, 25, 29, 282, 403.
Mexican Publications, Recent, 397.
Mexican Tropical Botanic Station, 398
Monarda fistulosa, Fertilization in, 381.
Monastery (written wrongly for Hermitage), garden at, 43.
Monograph of Cyperaceæ, 124; of N. A. Carices, 131; on Paspalum, 150; on Rhynchospora, 124; on Tannins, 364; on Viola, 130.
Monographs of Philadelphia Commercial Museums, account of, 428.
Mormodicas, A Few, 401.
Morphology, advance of, 11.
Morphology, 16; of the Androœcium of the Fumariaceæ. 310.
Morison's herbarium, 116.
Morocco, Flora of, 282.
Morong, Dr. Thos., 29.
Morris, Robert, Sago Palm, 435.
Mortgage of Eastwick on Bartram's Garden, 71.
Moss Chapter of Philadelphia, description of, 422.
Mosses, Macoun's Canadian, 272; Manual of, 187, 352; of Pennsylvania, 223; Study of, 187; of the Rocky Mountains and British America, 29.
Mount Desert, Flora of, 219.
Mountain laurel, 53.
Mount Washington, first botanical ascent of, 191.
Movement for modernizing cemeteries, 183
Movement of Protoplasm, 381.
Movements of Races of Men, 192.
Mucilage, Origin of, in Plants, 390.
Mueller, Baron F. von, 28, 29.
Müller, Dr. Christian, 97.
Muhlenberg, Gotthilf H. E., 4, 184; and Dr. Baldwin, 121; biography of 92; book of, 7; correspondence of, 93, 97; and the grasses, 96.

Muhlenberg family, 92.
Muhlenberg's Catalogue, reduction of, 8, 406; Herbarium, 96, 218.
Muhlenbergia, 96.
Mulberries at Bartram's, 70.
Mullein Oil, 377.
Mullica River, 3.
Munich, Forestry School at, 402.
Munich, laboratory at, 395.
Musci, catalogue of N. A., 352; frondosi, 422; hepaticæ, 422.
Mushrooms or Toadstools,, 293.
Mushrooms, cooking of, 315.
Museum of Economic Botany, 16.
Museum Buildings in West Philadelphia, 39.
Museum and garden, 397.
Museums of Philadelphia, 253.
Mycetozoa, Study of, 363.
Mycologic Center, Bulletin of, 428.
Mycological Club, Sketch of, 31; herbarium of W. C. Stevenson, 346.
Mycologic Flora of Chester County, 407; work of Geo. Martin, 248.
Mycotheca Marchica, 269; Universalis, 268; Veneta (Saccardo), 268.
Myrica inodora, 87.
Myrica, Notes on Genus, 378.
Mystics of Germantown, 46
Mystic sciences, 42.
Myxomycetes, Mr. Bilgram's collection of, 345; New American, 344; A new genus of, 363; study of, 342, 343, 345, 363.

Nägeli at Munich, 337.
Nama Rothrocki, 309.
Name of Schweinitz, von or de? 127.
Names of California Big-tree, 398.
Nantucket, Flora of, 219.
National Dispensatory, 277.
National Export Exposition, account of, 428.
Native Flora, Additions to our, 242.
Nativities cast, 46.
National Museum, 40.
Natural History, Elements of, 412.
Natural System, development of, 48.
Nectandra Puchury—major and minor, 207.
Nectaries, Secretion of Water from, 339.
Nectarines at Bartram's, 70.
Neiderlein, Gustav, Sketch of, 410.
Nelumbium luteum, Preliminary Notes on, 291.
Nereid Society, 4.
Neviusia Alabamensis, 17.
New Caledonia, Plants of, 281.
New Jersey Forester, 402.
New Jersey flora, studied by Dr. J. B. Brinton, 296.
New Jersey plants, Catalogue of, 242.
New Jersey flora and Mrs. Treat, 299.
New Mexican plants, 29, 282.
New Remedies, editor of, 318.
New York Botanical Garden, 272.
New Zealand plants, 281.
Nicaragua, 306; Account of, 428.
Nitella, 19.
Noisette Rose, 194.
Nom de plume of Capt. McIlvaine, 314.
North American fungi, 263.
North American Fungi, description of centuries, 267.
North American Herbarium, 26.
North American Plants, Check List of, 387.
North American Pyrenomycetes, The, 265.
North American Sylva, 157.
North Brook Chestnut Tree, 431.
North Carolina, Flora of, 388.
North Pacific Survey, 29.
Norway maple, introduced, 434.
Norway pine, 311.
Norway spruce, 69.
Northwood Park, 74.
Nostoc, 223.
Notable trees, articles on, 367.
Notes on some Species of Cucumis, 401.
Notes of Travel, 186.
Nursery of Josiah Hoopes, 287.
Nursery of Thomas Meehan & Sons, 254.
Nutgrove, estate of Nuttall, 157.
Nuttall, Thomas, 4, 24, 25, 144; assistant of, 231; and B. S. Barton, 112; bibliography of, 158, 159; biography of, 151; book of, 8; at Cambridge, 155; collections of, 24; lectures of, 197; paper by, 232; pecan tree of, 436; portrait of, 151; return to England, 157; return to America, 157; travels of, 112, 154, 156.
Nuttallia, 158.
Nymphæa odorata, 118.
Nyssa Ogeche, 133; sylvatica, 311.

Oak: Pin, 312; The Rock, 311, 312; The Swamp White, 311.
Oaks, The, 235; of North America, 7.
Objects of Commercial Museum, 35.
Observations on the Inhabitants, Climate, Soil, etc., Bartram's, 54.
Observations of Mr. Meehan, 254.
Observations on Some Parts of Natural History, 109.
Odes of Horace, 237.
Oil of Bay, 377, 378.
Oil of Birch, 365.
Oil paintings of Logan, 42.
Old field pine, 311.
Oleo-resins, Notes on, 377.
On Plants and Animals in their Wild State, 192.
On the Colonies of Plants Observed Near Philadelphia, 210.
Ontario Lake, 54.
Ontario Park, 253.
Opuntia Rafinesquii, 147; vulgaris in New Jersey, 328.
Orange leaf scab, 362.
Orcadella operculata, 363.
Orchids, 33.
Orchis spectabilis, 244.
Order of Worship, Reformed Church, 237.
Ordinance setting aside Bartram Garden, 74.
Oregon maple, 256.
Organic Materia Medica, Manual of, 277.
Origin of Floral Structures, 312.
Origin of Species, Darwin's, 5, 10.
Origin of Stars, The, 198.
Ornamental bed, 19.
Ornamental Trees, Handbook of, 25.
Ornithology, The American, 87.
Orobanche minor in New Jersey, 328.
Orontium aquaticum, 19.
Orthotricha, Note on, 363.
Oryzopsis, 158.
Osage orange, 118; introduction of, 9.

Osmorrhiza, 147.
Osmundo cinnamomea, var. frondosa, 328.
Outlines of Lectures on Materia Medica and Botany, 163.
Over-cup oak, 311.
Oxalis, 21; grandis, 384; recurva, 384.

Painters' Arboretum, 185; paper on, 406.
Painter, Jacob, biography of, 210.
Painter, Minshall, biography of 184.
Painting in oil of Robert Bridges, 195; of Geo. B. Wood, 180.
Paintings of Forest Leaves, 234.
Paintings of Logan, 42.
Palamedea carnuta, Skeleton of, 348.
Paleo-botany, 16, 187.
Paleozoic hills, 3.
Palm house of University, 21.
Pallas's herbarium, 116.
Palmer, T. Chalkley, biography of, 378; articles by, 379.
Palmer, Lewis, biography of, 348.
Palmer, Dr., 16, 25, 26, 29, 282, 326.
Palmetto, The, 340.
Palmettos, Tannins of, 365.
Papaw-tree, 433; at Vernon Park, 436.
Paper and Cloth, Origin of, 397.
Parasitic Plants, Germination and Growth of, 328.
Pardee Hall, burning of, 238.
Parker, Charles F., 26, 211, 323, 324; biography of, 229; and the flora of New Jersey, 231.
Parkinson's Herbal, 50.
Parlatore, Prof., of Italy, 281.
Parmentier, Nicolas S., 24.
Parry, Dr. C. C., 16, 25, 24, 26, 280, 282, 286, 326.
Partial Flora at Nazareth, A, 128.
Paspalum, Monograph on, 150.
Pathological botany, 16.
Paulownia, coffin made of, 180.
Paulownia imperialis, Structure of, 398.
Peaches at Bartram's, 70.
Peanut, 398.
Pears at Bartram's, 70.
Pear Tree of Lord Petre, 67.
Peary, Lieut., arctic expedition of, 367.
Peary expedition, botanist of, 221, 367.
Pecan tree of Nuttall, 436.
Peck, Professor of Cambridge, 116.
Peck, Prof. C. H., 266, 293.
Pediastrums of the U. S., 222.
Peirce arboretum, 410.
Peltandra undulata, Jelly-like Secretion of Fruit, 382.
Penikese, Mass., 304.
Penn's colonists, 272.
Pennsylvania Forestry Association, 32; Flora, Sketch of, 239; Forestry Statistics, 396; Herbarium, 238; Historical Society, 40; Horticultural Society, 40; Hospital, History of, 182; Plants, Check List of, 377; Railroad Company's Building, 36.
Pennsylvania Horticultural Society, first exhibition of, 194.
Penn Treaty Elm, 432; descendants of, 432.
Pentstemon lævigatus, 341; Smallii, 384.
Peppermint, Oil of, 365.
Pepsin, Essence of, 377.
Pereira's Materia Medica, 203.
Permanent Objects for Microscope, 310.
Persimmon, 255, 311.
Personon laurifolium, 66.
Peters, Rev. John E., 401.
Petre Pear Tree, 67, 433.
Peucedanum Canbyi, 366.
Pfeffer, Dr. William, 337, 380.
Phallus, A New, 352.
Pharmacy, American Journal of, 424.
Pharmaceutical Chemistry, Text-book book of, 365.
Pharmaceutical Side of Botany, 23.
Pharmacopœia by Geo. B. Wood, 182; revised, 204.
Phenol sodique, 377.
Phenological inquiries, 11.
Philadelphia, a botanic centre, 40.
Philadelphia Botanical Club, sketch of, 30; founded, 376.
Philadelphia College of Pharmacy, 173; Alumni Report of, 424.
Philadelphia Court of Honor, 396.
Philadelphia's distance from Atlantic Ocean, New York, Washington, 1.
Philadelphia, first settlement of, 1; grasses of, 330; Library Company of, 40; Moss Chapter, description of, 422; Museums, 253; Mycological Center, 31, 428.
Phlœm in Gelsemium sempervirens, 414.
Phlox Carolina, Analysis of, 365.
Photographs of Marshall house, 85.
Phyllostictas of North America, 248.
Physalospora Bidwellii, 361.
Physic, study of, by Bartram, 449.
Physiology, advance of, 11.
Phyto-Bezoars, Review of our Knowledge of, 398.
Phytolacca decandra, Properties of, 366.
Picea Engelmanni, 255, 290; orientalis, 290; pungens, 290; Sitchensis, 290; Smithiana, 290.
Pickering, Charles, 4, 11, 24, 25; biography of, 190; travels of, 192.
Pietists, German, 5.
Pike's Peak, Plants of, 323.
Pimenti and Cloves, 377.
Pines, Articles on the, 301, 302, 288, 289.
Pine, Norway, 311; The Red, 311.
Pine Street removed from City plan, 21.
Pinetum of Josiah Hoopes, description of, 288.
Pinguicula, Mrs. Treat's studies on, 299.
Pin Oak, Robust, 365.
Pinus Austriaca, 288; Banksiana, 219; Bungeana, 289; densiflora, 289; excelsa, 288; flexilis, 289; inops, 289; Koraiensis, 289; Lambertiana, 288, 295; Laricio, 288; monticola, 288; palustris, 289; Peuce, 288; ponderosa, 395; pungens, 243, 289; resinosa, 289; rigida, 289; rigida at Cape Henlopen, 311; Sabiniana, 289; Strobus nivea, 288; sylvestris; Tæda, 289.
Pioneers of Science in America, 92.
Pitchered Insectivorous Plants, 371.
Pitcher-plants, Preparation of Epidermis of, 371.
Plan to explore western territories, 55.
Plankton Society, 4.
Plant Analysis, 304; Chemistry, 375; Communities, 3; Doctors, Need of, 397; Form, Chemical Basis of, 375; Forms on Mexico Tablets, 396; Hairs, 334; Names in New Jersey, 399.
Plantæ Heermannianæ, 10, 177.
Plantæ Kaneanæ Groenlandicæ, 177.

Plantæ Prattenianæ, 177.
Plantago Patagonica var Aristata, 341.
Plantes Cryptogames de France. 268.
Planting of coniferous trees, 287.
Planting of trees in Fairmount Park, 349.
Plants Appearing in Flower in the Neighborhood of Philadelphia from February to November, 259.
Plants of Arctic Regions, 24; from Asia Minor, 29; Australia, 28; of Bahamas, 372; of Bolivia, 29; of Brazil, 29; of Chiapas Mexico, 29; of Chili, 29; of China, 28; of Delaware, 273; of Formosa, 28; of France, 28; collected by Wm. Gambel, 232; of Germany, 281; from Greece, 29; from Greenland, 29; from Guatemala, 29; of the Holy Land, 282; of Japan, 28; from Kurdistan, 29; of Lancaster Co., 241; of Lebanon, 282; of Lewis and Clark, 116; of John Lyon, 116; from Macedonia, 29; of Mauvaises Terres, 241; from Mesopotamia, 29; of Tabasco, Mexico, 29; of New Caledonia, 281; Catalogue of New Jersey, 242; of Pike's Peak, 323; of South America, 29; of Tasmania, 28; from West Indies, 29.
Plukenet's herbarium, 116.
Plums at Bartram's, 70.
Podophyllum Resin, 377; Structure of, 335.
Podophyllum peltatum, Variations of, 242.
Poems by Geo. Webb, 43.
Poems of Halliday Jackson, 223.
Poinsett, Mr., Mexican Minister, 195.
Poinsettia pulcherrima, introduction of, 195.
Poisonous fungi, 315.
Poisonous Plant, An Additional, 396.
Polecat Hollow, Legend of, 315.
Polemoniaceæ, 241.
Polygonaceæ, 241.
Polyporeæ, 269.
Pond of University, 19.
Poplar Tree, 311.
Pores of Libriform Tissues, 355.
Porter, Dr. H. C., 11, 16, 23; sketch of, 411.
Porter, Prof. Thos. C., 11, 280, 327, 383; biography of, 236; tribute to, 239; bibliography of, 241; encourages R. G. Bechdoldt, 347.
Portlandia, 118.
Puerto Rican Plants, 282.
Portrait of Wm. Bartram, 86; of J. W. Harshberger, 391; of Adam Kuhn, 88; of Le Conte, 149; of Muhlenberg, 92; of Rafinesque, 147; of Thos. Nuttall, 151; of David Townsend, 164; of Dr. Casper Wistar, 108.
Portulaca grandiflora, Irritable Stamens of, 249.
Post-graduate Class in Botany, 16.
Post, Dr., of Syria, 25, 281.
Potamogeton crispus, Discovery of in America, 225.
Potato, The Arizona, 310; Origin of, 399.
Potter's Clay, 3.
Powerful Temperance Sketches, 314.
Practice of Medicine, Treatise on, 182.
Pratt, Henry, garden of, 194.
Pratten's collections, 10.
Preface to Medicina Britannica, 50.
Preliminary Notes on Nelumbium luteum, 291.
Pre-Linnæan Period, 5.
Primeval forests, 311, 395.
Primeval Forest, 311.
Pringle, Prof. C. G., 16, 25, 26, 29, 282, 326.
Proceedings of the Academy of Natural Sciences, account of, 423; American Pharmaceutical Associaion, account of, 424; American Philosophical Society, 422.
Prodromus of Fresh Water Algæ, 317.
Production of Fruit, Statistics of, 399.
Progress of Systematic Botany in North America, address on, 239.
Proposition of Moses Marshall for western explorations, 105.
Prunus Alleghaniensis, a new plum, 242, 243; serotina, weeping variety of, 255.
Pterostyrax hispidum, 256.
Ptychosperma elegans, 33.
Public career of Thomas Meehan, 252.
Public services of Wm. Darlington, 137.
Public School, Landreth, 91.
Puerto Rico, botanical exploration of, 388; visited by Dr. Garber, 303.
Pumpkin, An American Plant, 397.
Purchase of Bartram's Garden, 72, 74; of Ellis's herbaria, 272; of Martindale's herbarium, 327.
Pursh, Frederick, 4, 24, 96, 111, 133, 330; book of, 8; and Lewis and Clark plants, 27; biography of, 113; travels of, 114, 115; diary of, 115.
Purshia tridentata, 366.
Pyrenomycetes, The North American, 265.
Pyrrhopappus Rothrockii, 309.
Pyrus coronaria, 407.

Quaker settlers, early, 2.
Quassia amara, 207; excelsa, 207.
Queen Ulrica of Sweden, 52.
Queletia mirabilis, 293.
Quercus dentata, 255; Gambelii, 233; heterophylla, 68, 323, 328; heterophylla, hybridity of, 68; heterophylla at Marshallton, 83; Phellos, 66; macrocarpa, 185, 349.
Questions on College Botany, 334.
Quinces at Bartram's 70.
Quincy's Medical Lexicon, 79.
Quinia, Estimation of, 365.
Quinine Bimurias, 377.

Rabenhorst's Fungi Europæi, 268.
Races of Man, Chart of, 234; movement of, 192; their Geographical Distribution, 192.
Rafinesque, C. S., 4, 66; biography of, 144; candidacy of University of Pennsylvania, 13; and Durand, 176; views on evolution, 147; genera of, 147; grave of, 146; herbarium of, 146; and Charles F. Parker, 230; portraits of, 147.
Rafinesquia, 147.
Rambles in East Florida, 303.
Ramsey, William H., 172.
Rand, Theodore, 32.
Ranunculaceæ, 8.
Ranunculus abortivus var. micranthus, 341.
Rarer Plants of Easton, 131.
Rare shrubs at Stenton, 42.
Raspberries at Bartram's, 70.

Raspberry experiments on, 405.
Rate of Circumnutation in Plants, 413.
Rattlesnake, Fascinating Faculty of, 110.
Ravenel, Dr. H. W., 25, 180, 266, 271; death of, 261; Fungi Americani, 267; Caroliniani Exsiccati, 261, 267.
Rau, Eugene A., biography of, 352.
Read, Mr. James, 24.
Red cedar, 53, 311.
Re-discovery of Lewis and Clark Plants, 116.
Redfield, John H., 4, 11, 25, 26, 282, 359; article by, 119; bequest of, 30; biography of, 211; bibliography, 217; Conservator of Botanical Section, 213; resolutions on death of, 215.
Redfield Herbarium Fund, 30, 217,
Redfieldia flexuosa, 215.
Red shale, 3.
Red-wood, 185; forests visited, 395.
Reedy Swamp Society, 4.
Reforesting Waste Lands in Holland, 402.
Rehm's Ascomycetes, 270; Cladoniæ, 272.
Reichert, John, 105.
Reinke, Prof., 337.
Reliquiæ Baldwinianæ, 97, 121, 141.
Removal of Thomas P. James to Cambridge, 187.
Report on Forests, 307, 313; of Forestry Commission, 308.
Report on Forestry, Gifford's, 402.
Reserves, forest, section suited for, 309.
Resins, Classification of, 409; work on, 23.
Resin of Podophyllum, 377.
Respiration in Plants, 339; in Diatoms, 379.
Resolutions on death of John H. Redfield, 215.
Retinospora ericoides, 256; pisifera, 256; squarrosa, 256; Japanese, 291.
Revision of the Pharmacopœia, 204.
Rex, George, 11; biography of, 342; authority on Myxomycetes, 342; portrait of, 342.
Rhamnus Purshiana, discovery of, 66; introduction of, 66.
Rhododendrons in Evans' Garden, 170; Notes on, 242.
Rhododendron Catawbiense, 384; maximum, movements of leaves, 399; punctatum, 87.
Rhus-poisoning, 378.
Rhus-toxicodendron, when most active, 397.
Rhynchospora, Monograph on, 124.
Ribes aureum, 118.
Richards, Dr. Herbert M., 354.
Ridgway, C. S., 32.
Rittenhouse Academy, 393.
Rivers, Delaware, Schuylkill, 1.
Roan, Mt., 384.
Robinson, Dr. B. L., 403.
Rockery, University Garden, 19, 20.
Rockhill, Thomas G., a merchant, 246.
Rodman Buttonwood Tree, 433.
Romell, L., Fungi Exsiccati Scandinavici, 270.
Ronaldson's Cemetery, 146.
Rooms in Bartram House, 59, 61.
Root Hairs, Action of, 312.
Rorer, Mrs. S. T., 32.
Rosaceous Genera, Structure of Cork Tissues in, 405.
Rose bay, 65.
Rose Manual, 195.
Rosicrucian Mystics, 46.
Rothrock, Dr. Joseph T., 11, 16, 26, 32, 180, 326, 359, 391; article by, 12; biography of, 305; botanist to Wheeler expedition, 306; collections of, 29; cruise to West Indies, 16; election of, 15; lectures by, 309; teaching of, 16; travels of, 306.
Rothrockia cordifolia, 309.
Roumeguere's Fungi Gallici, 271.
Rovirosa, Prof., 29.
Royal Botanic Museum, Berlin, 29, 184.
Royal Garden at Kew, 249.
Rudbeckia hirta, A Monstrous Specimen of, 312.
Rugel, Dr. Ferdinand, 326.
Rule, Robert J., 60.
Rushy, Dr., 282, 326.
Ruschenberger, Dr. W. S. W., 24; sketch of botanical work, 412.
Russian translation of Elements of Botany, 110.

Saccardo's Mycotheca Veneta, 268.
Sachs' History of Botany, 5.
Sachse, Julius F., book by, 5, 42.
Sadtler, Prof. S. P., 365, 375, 389.
Saffron, Note on, 390.
Sagittaria calycina, 226.
Sago palm at Bartram's, 70; of Robert Morris, 435.
Salisburia adiantifolia, 434.
Salix Muhlenbergiana, 96.
Salmon, I.
Salt Lake Basin, Sketch of the Botany of, 177.
Sand garden, 170.
Sandwich Island plants, 24, 282.
Sanguinaria Canadensis, 334; further remarks on, 335.
Sanitary Influence of Forest Growth, 350.
Saraca Indica, Bark of, 375.
Sargent, Prof. C. S., 282; suggestion of, 27; Silva of North America, 66.
Sarracenia, Description of New Species of, 159.
Sarracenia flava, 19; purpurea, 19; purpurea relations to S. variolaris, 340; variolaris, 299.
Sarracenia, Mrs. Treat's Studies of, 299.
Sarracenias, Southern, 21.
Sartwell, Dr., 280.
Sassafras, 255; Trees, 311.
Savin, 311.
Sawdust used to smother weeds, 170.
Scabiosa australis, 219.
Schäffer, Dr. Charles, biography of, 303.
Scammony, Essay on, 207.
Schively, Dr. A. F., sketch of, 412.
Schizæa pusilla, 217, 297.
Schizophytic Society, 4.
Schleiden, book of, 10; views of, 10.
Schmaltz, C. S. Rafinesque, 144.
Schmucker, Dr. C. S., 32; sketch of, 413.
Schnor, Dr., 281.
Schobbenhausen, Frederick, lands of, bought by Bartram, 58.
Schomburgk, Robert H., biography of, 190; line of, 190.
School of Biology, erection of, 15, 17.
Schöpf, Dr. Johann David, 93.
Schrader, Heinrich Adolph, 96.
Schreber, 96.
Schultes Bipontinus, 281.

Schuylkill River, 1, 54.

Schwægrichen, Dr. D. F., 24, 130.
Schwartz, Prof. Olof, 96.
Schwartzmann, H. J., architect of Horticultural Hall, Fairmount Park, 430.
Schwendener, Prof., 337, 354.
Schweinitz, L. D. de, 4, 24; bequest of, 24; biography, 127; book by, 9; herbarium of, 130; journeys of, 129; published species of, 266.
Schweinitzia odorata, 132.
Sciadopitys, 290.
Scientific Journals, historical account of, 122.
Scolasticism, medieval, 5.
Scott, Prof. William B., address of, 239.
Scrophulariaceæ, 241.
Scutellaria nervosa, 225; resinosa, 243; saxatilis, 225.
Scytonema, 223.
Sea Grass Society, 4.
Seashore Plants, 396.
Sea sickness, description of, 201.
Sea Weeds, articles on, 285.
Seckel, Lawrence, 435.
Seckel Pear Tree, The Original, 435.
Second period of botany in Phila., 5.
Seed business of Robert Buist, 194.
Seed catalogue of Bartram's garden, 69.
Seeds from Himalayas, 169; of sugar maple, 53.
Selfish Flower, The, 293.
Seneca Indians, 223.
Senecio præcox, Water Storage in, 398, 399; Smallii, 384.
Senna Cassia, 206.
Sensitive Plants under Colored Screens, 372.
Septoria, Synopsis of Species of, 248.
Sequoia gigantea, 135, 395; sempervirens, 185.
Sequoia, A Pennsylvanian, 312.
Serial Publications, historical account of, 422.
Serpentine Rocks of Hoboken, 154.
Sex in plants, 4.
Sexes of Plants, doctrine of, 5.
Sexual System, 6.
Sexual Variations in Castanea Americana, 323.
Seymour and Earle, Economic Fungi, 270.
Shad, 1.
Sharpless, Dr. Wm. T., 97, 227, 410.
Shaw garden, St. Louis, 18.
Shepherdia argentea, 365.
Sherard's herbarium, 116.
Short, Dr. Charles W., 25; herbarium of, 25, 26.
Short's Medicina Britannica, 50.
Shrigley, Ethel Austin, paper by, 432, 436.
Siberian plants, 24, 281.
Sierra Leone, collections of fungi, 267.
Siphoptychium Casparyi, 343.
Sisyrynchium Arizonicum, 310.
Sium Carsonii, 341.
Sketch of Flora of Penna., 239.
Sketch of the Botany of Salt Lake Basin, 177.
Sketch of the Botany of South Carolina and Georgia, 121.
Sketches, Powerful Temperance, 314.
Small, John K., 383.
Small parks, Mr. Meehan interested in, 252.
Smilax rotundifolia and Thomas Nuttall, 152.
Smith, Aubrey H., 29, 259; biography of, 210; herbarium of, 210; plants from, 16.
Smith, Charles E., 259, 353, 359; biograpay of, 227.
Smith, Daniel B., biography of, 173; collections of, 23.
Smith, George, biography of, 188; book of, 167.
Smith, John Jay, 118; biography of, 183.
Smith, Kline, French & Co. purchase Martindale Herbarium, 327.
Smith, Uselma C., biography of, 319.
Smithsonian Institute, 40.
Smyrna box-wood, 433.
Societies, plant, 4.
Soda Water, first manufacture of, in Philadelphia, 175.
Soja bean, 366.
Solanum tuberosum, Origin of, 399.
Solidago humilis, 242; Muhlenbergii, 96; Roanensis, 384; Gadkinensis, 385.
Sorghum, Sugar from, 376.
South African plants, 281.
South American plants, 24.
South Floridan plants, 282.
South Seas, Exploration of, 191.
Southworth, Miss Effie, 354.
Spanish plants, 281.
Spalding, Mrs. Volney M., 354.
Sparassis, Herbstii, 293.
Sparganium eurycarpum, 19.
Spearmint, Oil of, 365.
Specimen Floræ Americæ Septentrionalis Cryptogamicæ, 130.
Spectral flames, 46.
Spegazzini, 267; Hongos Sud Americanos, 269.
Sphæria, Descriptions of, 131.
Sphagna, Additions to Habitats of, 352.
Sphagnum bogs, 3; Bog Society, 4.
Spiralism, Vegetable, 294.
Spirogyra Cells, Abnormal Growth of, 355.
Spirogyra, Conjugation of, 371.
Spirogyra nitida, Chemico-physiological Study of, 411.
Spook Hill, 46.
Spores of Myxomycetes, 363.
Sprengel Kurt, 96.
Spruce, The Red, cones, 53; tidewater, 290.
Stachys cordata, 242; Rothrockii, 309.
Staining of vegetable tissues, double, 257.
Staining of vegetable tissues, 310.
Staircase in Bartram house, 62.
Starches in Cacao, 334; of Root and Rhizome Drugs, 334.
Starch Grains, Study of, 390.
State Botanist of Pennsylvania, 251.
Statistics of Pennsylvania Forests, 396.
St. Augustine, Life and Labors of, 237.
St. Domingo plants, 24.
Steironema, 147.
Stellaria humifusa, 219.
Stenton, Germantown, 42; Park, 74, 253.
Stevenson, Wm. C., Jr., 345; biography of, 346.
St. John quoted, 59.
St. Michael's Church, Germantown, 46.
Story of big cypress, 65; of the daisy and Bartram, 47.
St. Petersburg, seeds from, 18.
Strawberries at Bartram's, 70.
Strength of Timber and Medullary Rays, 312.
Strides of horticulture in Philadelphia, 194.

Stuartia pentagyna, 87.
Study of Mosses, 187.
Study in Forestry, with original Paintings of Forest Leaves, 234.
Sugar Cane, 237.
Sugar Maple, The, 311; seeds of, 53.
Sugar from Sorghum, 376.
Suitability of Philadelphia as a botanical centre, 40.
Suksdorf, William, 266, 282.
Sullivant, W. T., 187, 280; collections of, 281; letter of, 226.
Summer Schools in Botany, 339.
Superstition and Corn Smut, 293.
Susquehanna River, 54
Swamp magnolia, 20.
Swamp Plant, Aerating Organs of, 339.
Swamp Society, 4.
Sweet fern, 53.
Sycamore, 255.
Sydow's Mycotheca Marchica, 269; Uredineæ, 269.
Syllabus of Lectures on Materia Medica, 163; of Natural Orders, 345.
Sylva Telluriana, 66.
Symphoricarpos racemosa, 118.
Synopsis of the Flora of Colorado, 238.
Synopsis Fungorum, 9.
Synopsis Fungorum in America Borealia, 131.
Synopsis Fungorum Carolinæ Superioris, 130.
Synopsis of the North American Species of Septoria, 248.
Syrian plants, 25.
Syrupus aurantii, 377; lactucarii, 377.
Systematic beds of University garden, 17.
System of Engler and Prantl, 18.
Systema Naturæ, 6.

Table Rock, 384.
Taccaceæ, 206.
Talinum teretifolium, 103; communication on, 393; Ecological Study of, 398.
Tanning of Some Acorns, 366; of Quercus alba, 390; Value of North American Trees, 365.
Tanning material, 36; Properties of Bark of American Trees, 365.
Tannins, A Monograph on, 364; Report on, 366; of Palmettos, 365; work on, 23.
Tatnall, Edward, biography of, 225.
Taxodium distichum, 65, 185.
Taxonomy, advance of, 11.
Taxonomy, 16.
Teaching of botany, 310.
Telegraph Company, headquarters of, 306.
Teosinthe and Maize, Fertile Crosses of, 397.
Tertiary period, 2, 3.
Testing department, 37.
Testudinaria elephantipes, 70.
Tetramerism in Lilium auratum, 218.
Texas Sarsaparilla, 207.
Texas Southern, botanical explorations of, 388.
Texo-Mexican plants, 28.
Text-book of Botany, Strasburger, Noll, Schenck, Schimper, 411.
Text-book of Pharmaceutical Chemistry, 365.
Thalictrum coriaceum, 385; polygamum, 385; macrostylum, 385.
Thelephoreæ, 269.
Theosophical colonists, 42.
Therapeutics and Pharmacology, Treatise on, 182.
Therapeutics, Treatise on, 318.
Thermotropic Movements in Leaves of Rhododendron, 399.
Thesis of B. S. Barton, 109.
Third period of botany in Phila., 8.
Thorn at Bartram Garden, 68.
Thuja occidentalis, 256.
Tillæa, 158.
Tillandsia, 150; Notes on, 303.
Tilmadoche compacta, 363.
Timber line of high mountains, Meehan's views on, 218.
Tim Price Yarns, 314.
Tinctura moschi, 377.
Tinctura strophanti, 377.
Tinicum Island, 210.
Toadstools, cooking of, 315; edible, 31, 315; poisonous, 315.
Tobe Hodge, 314.
Toms River, 3.
Topographical Atlas of Pennsylvania, Walling & Gray, 239.
Topography of Philadelphia, 2.
Torrey, Prof. John, 151, 280; and Gray, 96.
Torrey's Peak, 218.
Tower of Bartram house, 59.
Townsend, David, 4, 285; biography of, 163; portrait of, 164.
Townsendia, 163, 164, errata.
Townsendia Rothrockii, 309.
Townsend, John K., 156.
Tracey, Prof. S. M., 266.
Transactions American Philosophical Society, account of, 423.; Wagner Free Institute, 425.
Transactions and Proceedings of the Botanical Society of Pennsylvania, account of, 428.
Trans-Continental Survey, Villard's, 283.
Translation of German Text-book of Botany, 411; of Greek inscription, Bartram house, 59; of Michaux's Forest Trees of America, 183.
Transpiration and Leaves, 340; of plants, 350.
Transylvania University, 145.
Trautvetteria palmata, 87.
Travels into Arkansa Territory, 159.
Travels of Dr. William Baldwin, 122; of Bartram, 51, 54; of Wm. Bartram, 7, 86; of Wm. Canby, 280; of Wm. Gambel, 231; of John Gifford, 402; of Kalm, 77; of Moses Marshall, 102; of J. C. Martindale, 323; of Nuttall, 112, 153, 156; of Dr. Pickering, 192; of Pursh, 114; of Rothrock, 306.
Travels through North and South Carolina, etc., 86.
Traveler's tree, 33.
Trelease, Dr. William, 386.
Treat, Mary, 11; articles by, 111; biography of, 298; mentioned by Darwin, 299.
Treatise on Coniferæ, 286; on Materia Medica and Therapeutics, 318; on Navigation, 79; on the Practice of Medicine, 182; on Therapeutics and Pharmacology, 182.
Treatment of servants by Bartram, 50.
Treaty Elm Park, 253.
Treaty Elm, 432.

Tree Charts, 235; ferns, 33; form, 312; growth, 311; photography, 312.
Trees in Bartram Garden, 433; of Philadelphia, sketch of noted, 431.
Trianea bogatensis, 19.
Tribute to Prof. Thomas C. Porter, 239.
Trichias, Banded-spore, 344.
Trifolium Virginicum, 386.
Trimble, Prof. Henry, 11, 23, 375, 390; biography of, 368.
Trinidad plants, 282.
Trips of Moses Marshall, 105.
Tritration of Ammonium Carbonate, 377.
Tropical Botanic Station, 398.
Tropical forest, imaginary, 33.
Trout, 1.
Trustees of University, letter to, 13.
Tsuga Pattoniana, 290.
Tubers of Dioscorea species, 277,
Tubulina cylindrica, Notes on Development of, 343.
Tuckerman, Dr., 180, 356.
Tulip poplar, 311.
Tulip tree, 255.
Tunnel Rock, Fairmount Park, planted with trees, 349.
Tuolumne Big-tree Grove, 395.
Tupelo, 255.
Turkey boxwood, 433.
Tyler, John J., 185.
Typha latifolia, 19.
Tweedy, F., 29, 195, 282.
Tweedia, 195.
Twins of Weasel Branch, 314.

Ulmus Americana, 256.
Ulrica, Queen, of Sweden, 52.
Uncle Isaac, 47.
Underwood, Prof., 327.
Unitas Fratrum, 127.
University Extension Classes, 370.
University of Pennsylvania, 40, 97; chair of botany at, 7; Botanic Garden of, 17; History of, 182; oldest botanical centre, 11.
University of Upsal, 88.
Umbilicaria, 96.
Upsal, 88; M'Mahon's called, 117; University of, 88.
Uredineæ, Sydow's, 269.
Utricularia, 150; Mrs. Treat's studies on, 299.
Use of Plants among Ancient Peruvians, 398.

Vacation Cruising, 310.
Vaccineæ, new plants of, 159.
Valerianella Woodsiana var. patellaria, 341.
Valsei, Additions to, 346.
Valley of Mexico, Flora of, 398.
Value of Botanical Gardens, 372.
Vanduzen, Matthew, 432.
Vanilla, Varieties of, 378.
Van Vleck, Jacob, 97.
Variation in plants, study of, 408.
Variation in Leaves, 327.
Vascular cryptogams, study of, 411.
Vasey, Dr. George, 16, 280, 327, 385.
Vauxhall Garden, 433.
Vegetable fibres, 36.
Vegetable and Animal Cells, Structure and Division of, 368.
Vegetable Cell, Structure and Division of, 371.
Vegetable Histology, 334.
Vegetable Kingdom, Chart of, 234.
Vegetable Kingdom, Lindley's, 284.
Vegetable Materia Medica, 160; of the U. S., 162
Vegetable Tissues, Staining of, 310.
Vegetation of Yellowstone Hot Springs, 398.
Venus fly-trap, 21; movement of leaves of, 369.
Venezuela Fungi, 271.
Venezuela and Guiana, boundary of, 190.
Veratrum viride, Structure of, 355.
Verbena Tweediana, 195.
Verbesina, Abnormal Flowers of, 398.
Vernal Flora, Origin of, 396.
Vernon Park, 184, 253; papaw trees of, 436; trees of, 436.
Viburnum plicatum, 255.
Victoria regia discovered, 190.
Victoria tank, 19.
Villard's North Trans-Continental Survey, 283.
Vine, Fungous Diseases of, 362.
Vine growing at Spring Mills, Pa., 409.
Viola, 150; monograph on, 130; Morphology of, 390.
Violet Perfume, 390.
Viola tricolor, Botanical Study of, 390.
Viola tricolor, var. arvensis, 242.
Virgilia lutea, 433.
Visit of Pennsylvania Horticultural Society to Bartram Garden, 88.
Vital Force, Correlation of, 310.
Vitality of Girdled Limb, 304.
Vitis pterophora, 401.
Von Schweinitz, L. D., 4, 9, 24.

Wagner Free Institute, sketch of, 32; Transactions of, 425.
Walmsley, W. H., 22.
Waifs of Fighting Rocks, 314.
Walling & Gray's Topographical Atlas, 239.
Walnuts, The, 236.
Walnuts at Bartram's, 70.
Walnut, The Black, 311; The Row Farm, 311.
Walter's herbarium, 116.
Walton, Joseph, article by, 245; biography of, 243.
Wanamaker, John, garden of, 400.
Waples, Professor E. B., 393.
Warmer burial-ground, 46.
Washington, Arbor, 67.
Washingtonia, 147.
Washingtonia filamentosa, Salt and Sugar in, 365.
Watson's Botany of Clarence King's Expedition, 187.
Water-color sketches of flowers, 414.
Watson, Gavin, biography of, 246.
Waterhouse, John F., biography of, 172 lectures of, 173.
Water hyacinths, 19; lilies, 19.
Water Storage and Conduction in Senecio præcox, 398, 399.
Wax Palms, 33.
Weasel Branch, Twins of, 314.
Webb, George, Poem of, 43.
Weeds, Two Centuries of American, 291; of Maine, 358.
Welcome Spring Flowers, 293.
West Indian trees in Florida, 302.
West Indies visited by Dr. Rothrock, 307.

Westtown Farm, flora of, 244.
Wheeler, Lieut., explorations of, 306; report of, 310.
White azalea, 20; birch, 20; cedar, 53; pine, 288, 311.
White Cap, Cruise of, 307.
White Cedar, Distribution in New Jersey, 402.
White Mountains, exploration of, 191.
White Oak Bark, Chemical Study of, 389,
White Sulphur Springs, trip to, 386.
Wigand, Dr., death of, 355.
Wilder, Prof. Burt G., 304.
Wilkes, Lieut. Charles, 191.
Will of Rafinesque, 146.
Williams, Mr. and Mrs. Talcott, 32.
Williamson, Chas. C., biography of, 374; botanical trips of, 374.
Williamson, John, Notice of, 219.
Wilson, Alexander, and Bartram house, 62, 87.
Wilson, Prof. E. B., 354.
Wilson, Mrs. George, presents orchids, 21.
Wilson, Dr. Lucy L. W., Sketch of, 415.
Wilson, Dr. Thomas B., 188.
Wilson, Prof. Wm. P., 11, 33, 354, 391; biography of, 335: bibliography of, 339; studies on bald cypress, 338; teaching of, 16.
Window Gardens, Home and School, 398.
Wingate, Harold, biography of, 363.
Wintergreen, Oil of, 366.
Wissahickon, colonists on, 42.
Wissahickon Creek, 2; region, 2; woods, 396.
Wistar, Dr. Caspar, biography of, 108; portrait of, 108; and western exploration, 105.
Wistaria, 108.
Wistaria or Wisteria? 108.
Wistar, Gen. I. J., letter to Prof. Sargent, 232.
Wister, Charles J., 196; biography of, 144.
Wister, W. Wynne, 144; biography of, 196.
Witch hazel, 53.
Witt, Christopher, biography of, 42; garden of, 43.
Wolle, Rev. Francis, 11, 352: biography of, 221; bibliography of, 223.
Wood, Dr. George B., election of, 316, 317, 15; biography of, 180; oil painting of, 180.
Wood, Dr. Horatio C., 11, 15; biography of, 316.
Woodland Avenue, 19.
Woodlands Cemetery, 113.
Woodlands, 113, 133; gingko tree, 434.
Woods of America, 36; of Berks County, 186; of Mexican Republic, 37.
Woodshed at Bartram's, 63.
Woodstown Natural History Club, 406.
Woodwork over porch, Bartram's, 59.
Work of J. B. Ellis, estimate of, 265.
World's Columbian Exposition, 338.
Wright's Cuban Fungi, 271.
Wyeth, Captain, plants of, 155.
Wyoming plants, 241.

Xanthoxylum emarginatum, 302.

Yellow gravel, 2.
Yellow snow, 242.
Yellowstone Hot Springs, Vegetation of, 398.
Yellowstone National Park visited, 395.
Yellowstone plants, 29, 241.
Yellow-wood, 65, 433.
Yellow-wood of Germantown, 436.
Yosemite Valley, trip to, 395.
Yucca angustifolia, Chemical Study of, 375.

Zamia, 70.
Zamia integrifolia, 207.
Zanthoxylum Americanum, 113.
Zantzinger, 25.
Zelkova crenata, 113; account of Woodlands, 434.
Zelkova Keaki, of Japan, 435.
Zentmayer, Joseph, 257, 345.
Zentmayer microscopes, 224.
Zinzendorf, Count, 127.
Zizyphus vulgaris, 256.
Zoological and Floral Distribution of the United States, 209.
Zoology, professorship of, 14.
Zwingli, Ulric, Life and Times of, 237.

Date Due

580.92 H32B

a39001 007143558b

580.92
H32b

72-1